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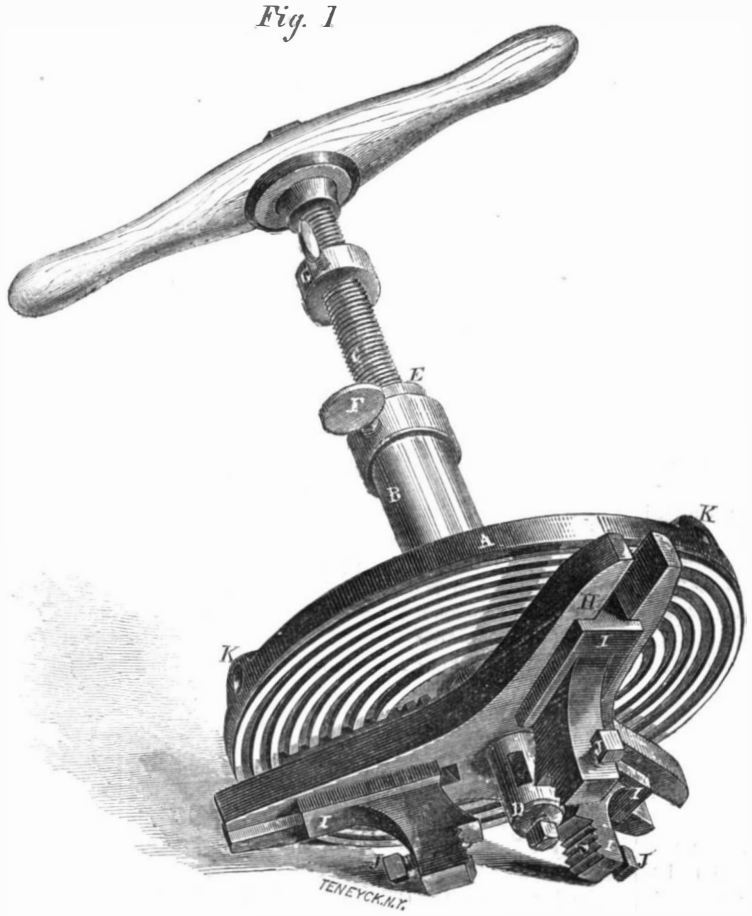
Hub-Boxing and Spoke Tenoning.

Many operations in the arts, which to all intents and purposes are manual, can be greatly facilitated by the introduction of simple and efficient tools. The annexed engravings are representations of very excellent tools of their class; and will be found valuable aids to the wheelwright and wagon-maker. Fig. 1 is a perspective view of the hub-boxing machine. It is self-adjusting, strongly made, and not at all clumsy or awkward to handle. The operation and construction of the several parts will be easily understood, by referring to the subjoined description.

Fig. 1



L. A. DOLE'S HUB-BOXING AND SPOKE TENONING MACHINES.

The self-centering machine is provided with a scroll-plate, A, which turns freely on a hollow stem, B. This stem is fitted with a mandrel, C, one end of which is furnished with a strong handle, while the other extremity has a mortise, D, cut through it, in which the cutter is placed. The upper end of the hollow stem is chambered out, and has a feed-nut, E, let into it, which is secured by the set screw, F, working in a groove in the body of the nut. The gage, G, on the thread, affords a ready means of regulating the depth to which the cutter works. On the scroll-plate may be seen a triangular plate, H, having forked ends, in which the chucks, I, slide; the feet of the same being grooved to fit the plate. The ends of these chucks are creased, and fitted with set screws, J, so as to hold the machine on the hub without shifting its position. When it is desired to use the tool, the wrench provided for the purpose is inserted in the holes, K, in the scroll-plate, which is revolved until the chucks, I, open wide enough to grasp the hub. As they all move from the center, the bit, or cutter, is always in the proper place when the jaws bite the hub; this is attained by setting them up forcibly against the work with the wrench aforesaid. This machine is made in several sizes, to suit the capacity of the work to be done; and will materially lessen the time and labor heretofore expended on this portion of the wheelwright's duties.

The hollow auger, or tenoning machine, Figures 2 and 3, is also a very simple and useful tool, and requires very little detailed description to render its construction intelligible. The operation of it can be seen at a glance by referring to Fig. 2. It is fitted up in two different styles; the character of the tool remaining the same in both. In Fig. 3, the tool is shown as fitted for use in a common carpenter's brace; having a squared shank, A, screwed into a metallic socket, B; this socket is a part of the metallic disk, C, in which the cutters, D, are placed. The arrangement of these cutters, and the ingenious method by which they are set out to the size it is desired to make the tenon on the spoke, are worthy of special notice. The milled edge of the brass ring, E, enables the workman to turn it (by slacking up the small screws, F, in the face-plate) so that the curved projections, G, inside, bearing on the end of the cutters, force them in toward the center of the tool. The cutters also have a slot in them, which fits over and under the plate I; so that by tightening the screws, F, the cutters are retained firmly in their places. The arrangement in Fig. 2 represents the bench attachment, where the hollow auger works through a bearing, A; the end of which is provided with a dog, B, to hold the end of the spoke, while the hub of the wheel is fastened to the opposite end of the frame. A small bolt working through the slot in the bearing, A, serves to regulate the height of the machine to suit the different kinds of hubs.

Fig. 2

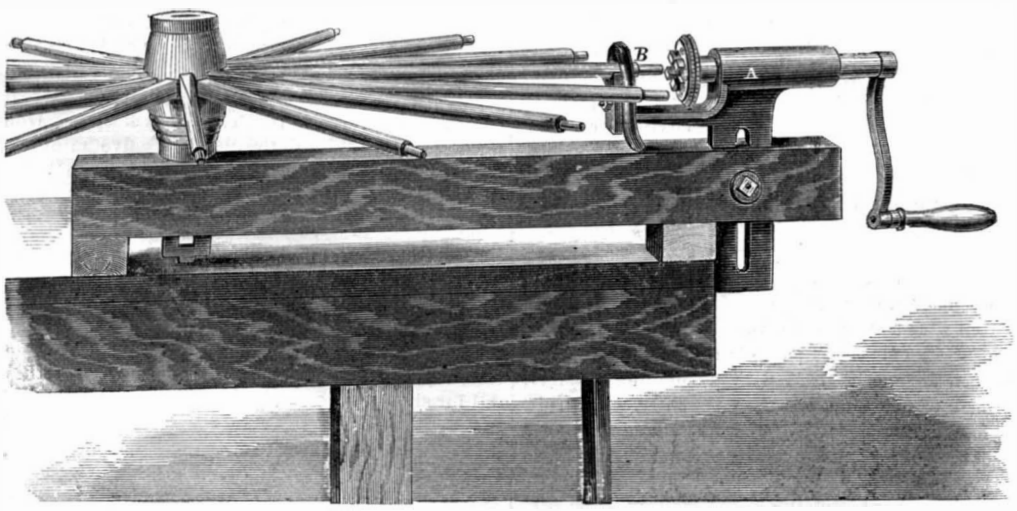
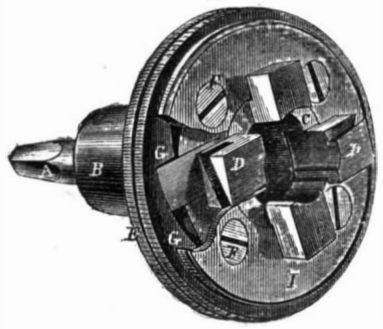


Fig. 3



The tenoning machine is also adapted to boring felloes, being provided with a chuck for holding auger bits, that screws on the same mandrel in which the hollow auger is held; in the end of the mandrel is a square socket to receive the bit. The chuck is also provided with 3 set screws, which tighten against the shank of the bit, for the purpose of trueing it, and preventing its being withdrawn from the socket.

The felloes are held by a screw clamp, so that they may be bored perfectly true, and fit upon the shoulders of the spokes without straining the tenons; thus making a better and truer wheel than is possible by the common method; doing the work much

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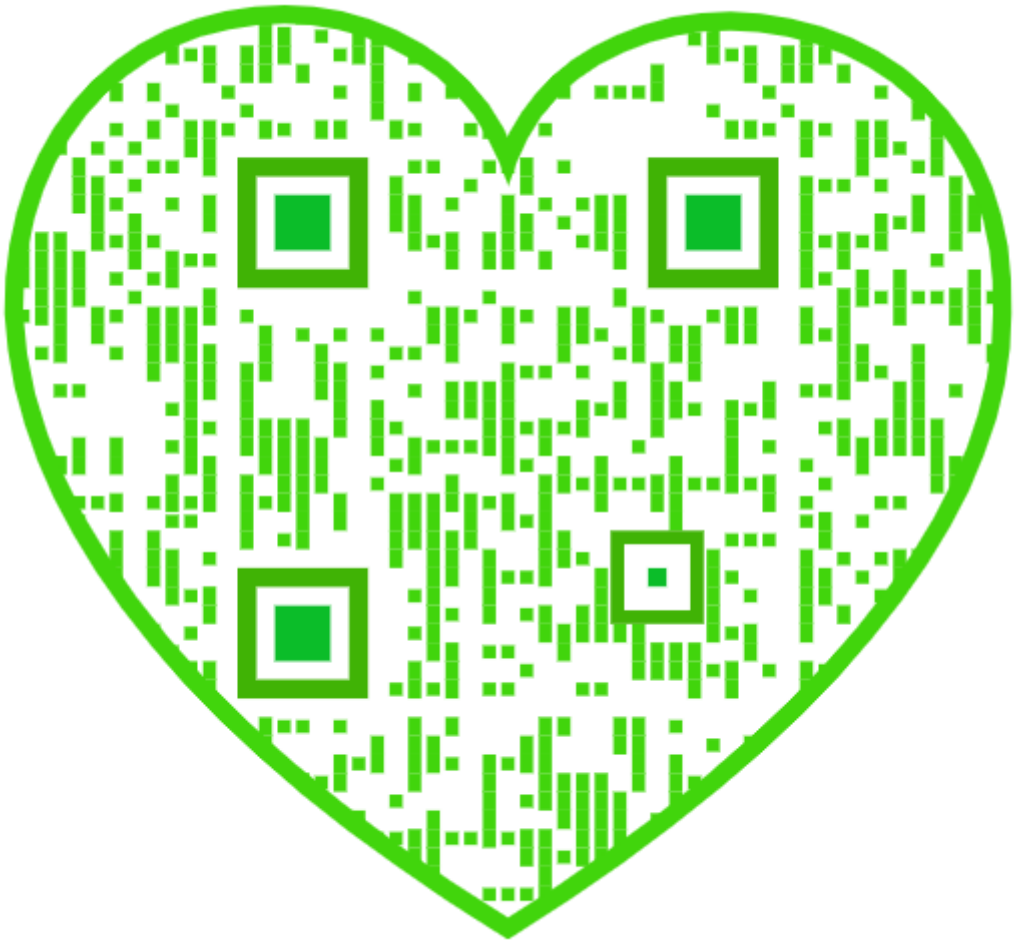

faster, and with but little labor. Patented on Jan. 10, 1860. For additional information, address the manufacturers, Dole & Silver, Salem, Ohio; or Cornelius Van Horn, 29 Park Row, New York.

Forging Heavy Shafts.

The art of forging is of such a practical character—depending upon acquired experience—that every item of information connected with it, when derived from a reliable source, is of great interest to a very large number of our readers. The following extracts on this subject are from a paper lately read before the London Association of Engineers, by Mr. Muir, of the Woolwich Arsenal:—

"In fagotting from slabs, it should be a rule to place invariably the thinnest slabs in the heart of the fagot, so as to insure that the heat applied should permeate the whole mass equally.

"It was a well-known fact that heavy shafts—for example, propeller shafts—which have to be coupled by means of large collars or flanges, are very difficult to forge soundly. Not unfrequently, after great care had been taken, the collars were found to be so hollow that a two-foot rule might be concealed in the central cavity. Mr. Muir objected to having those collars rounded in forging, although he could find few who agreed with his views. It was far better to forge the collars or flanges of such shafts as those he had referred to, square, and to round them up afterwards. It was his impression that solidity would be found to result from this process, in almost all cases; for if a proper heat were taken upon the work, it was next to impossible for a square forging to be made hollow. On the contrary, a circular forging could scarcely be made solid. The advantages arising from the mode of procedure he had indicated, were, he thought, undeniable; the objection to it was its extra cost.

"In one remarkable instance he had been permitted to forge a propeller shaft with a square flange. At four heats the four corners of the square were taken off, the flange was rounded up, and the work proved, as he had anticipated, a great success. He entertained, moreover, a very strong opinion that the great difficulty which had been experienced in obtaining a sound malleable iron gun, might be overcome by first forging it in the square, instead of the round form. There were many reasons for supposing—and, indeed, he might say that he knew—that many an important forging had been lost, or at least was sadly deteriorated, by the fagot having been composed of different kinds of iron: say, for example, hard and soft. In this case there would be a natural resistance to amalgamation. Great care and practical judgment, therefore, were required in assorting the irons to be employed for particular forgings; and in putting them into classes, in accordance with the special purpose to be served.

"He would also recommend that, in any forging requiring taking down, well-rounded sets should be employed, so as to leave always a gusset or fillet, which would save the grain of the iron, and it could easily be turned off afterwards if required. It was desirable, also, to put the last wrought heat into the furnace, after it had been worked either by planishing or swaging, and thus bringing it to a low red-heat. This was a kind of annealing process, which equalized the consistency of the surface. Besides, if one part of the latter had happened to get a larger share of the hammering than another, the forging would, while undergoing this ordeal, manifest a tendency to bend, and this would be the fitting time to straighten it. Whatever the nature of the piece of work in hand, only so much of it should be made hot, or at least be brought to a welding heat, as can be at the same time operated upon. The parts submitted to unnecessary heatings will crystallize, and, as a matter of course, become weak or brittle. In piecing or lengthening shafts, or large forgings of any kind, Mr. Muir recommended that, when lays were used for the purpose, the scarfs of those lays should be left tolerably thick at the points. If they are thinned too much, the air acts upon them when drawn from the furnace, and they are sure to be too cold before reaching the anvil."

A LINE of telegraph, under the charge of English engineers, is being laid through Turkey and Persia, to India.

Opacity and Transparency.

Some bodies are called opaque, and others transparent, according to their capacity for transmitting or reflecting light. But many bodies are commonly held to be colorless and transparent, when the reverse of this is the case; while others again are considered to be opaque, when they possess the qualities of transparency. White glass, for example, which is considered a transparent substance, is only approximately so; as it arrests a great deal of light. It is not so transparent as pure water; and even this, as has been shown by Professor Tyndall, has a blue-green color when light has passed through fifteen feet of it. Even air is far from transmitting all the light which enters it. A comet is incalculably more transparent than the earth's atmosphere. The light of a star passing through hundreds of thousands of miles of a comet's atmosphere and nucleus, loses less light than in passing through the thin stratum of air which covers the earth; yet even the comet is imperfectly transparent, and we know that glass is as much opaque, compared with it, as gold is when compared with glass; and from this we readily learn to believe that transparency and opacity are only comparative terms—that nothing transmits all the light. Even metals, which are usually taken as types of opacity, transmit light in thin films; and each metal has a proper color of its own. Thus, gold leaf viewed by transmitted light, looks green, brown, violet, red, purple, or blue, according to the thickness of the film; silver leaf is grey-violet, purple or brown; copper is green, antimony is grey, arsenic is brown, platinum grey, palladium grey and rhodium blue. Most bodies transmit a colored light, the color deepening as the thickness increases, until it is so dark that we call it opaque.

Professor Faraday observed that some of the gold films he experimented with, when reduced very thin by chemical means, lost part of their reflecting power, though they continued to be free from any material injury to their surface or integrity; proving that some depth of matter is concerned in ordinary reflection. Different kinds of reflecting surfaces have different appearances; this is probably due to the effect produced upon the light, by its passage into and out of that thickness of matter which is concerned in ordinary reflection. Of homogeneous matter opaque gives metallic lustre and transparent vitreous; as a general rule, we find the more nearly a substance approaches the metals in opacity, the more it resembles them in the nature of its lustre.

The Flax Crop.

The flax crop of the United States this year will be larger than ever before raised in this country, and inquiries are made as to the best mode of disposing of it. One of our exchanges advises the farmer, after thrashing out the seed, to stack the straw carefully, protect the stacks with boards, or a good thatch, and await the coming of customers, who will appear between this and the close of the year. It is important that the straw be kept dry, otherwise it will rot, and the fiber be destroyed. From present appearances, there is no doubt that there will be demand for every tun of flax raised; and farmers will do well to preserve all their straw in good condition. The preparation of fiber had better be left for those who make that their special business. In view of the increasing importance of flax, consequent upon the suspension of cotton growing, we advise our inventive readers to examine and see if they cannot produce improvements in flax-dressing machinery. The field for this class of inventions seems to be a good one.

BARBAROUS MUSICAL INSTRUMENT.—The Caffre lyre is a bent bow, strung with twisted hair, which when beaten with a stick, will give out four or five distinct tones. The Macabera piano is a series of sonorous wooden bars, each backed by a sounding chamber, formed of the rind of a dried and hardened fruit. It has one or two notes, which resemble those of a cracked bell. A nice instrument for an amateur, or an evening party.

AN immense trade has sprung up in preparing the horse-radish for home and foreign markets. Dishonest dealers largely adulterate the root with the common turnip.

Surgery in Afghanistan.

The Afghans, from their rough and hardy life, acquire by experience very practical, though, to be sure, uncouth, methods of righting themselves, their horses, and cattle, when they may suffer from accidents. Their operations for the reduction of dislocations in the human subject are most original; and, if report speaks at all truly, equally successful.

For a dislocation of the thigh, the unfortunate patient is sweated and starved for three days in a dark room, the atmosphere of which is heated by fires kept burning night and day; and the effects of this high temperature are increased by drenching the patient with copious draughts of warm rice-water or thin gruel. During the interval that this treatment is enforced on the patient, a fat bullock is tied up and fed *ad libitum*, with chopped straw flavored with salt, but is rigidly denied a drop of water. On the third day the patient is made to ride the bullock or buffalo astride, a felt alone intervening between him and the animal's hide; his feet are next drawn down and fastened tightly under the animal's belly by cords passing round the ankles. All these preliminaries arranged, the animal is then led out to water, and drinks so greedily and inordinately that its belly swells to nearly double its former size. The traction produced by this on the dislocated limb is sufficient to bring the wandering bone to its socket.

The method of reducing a dislocated shoulder is quite as curious and interesting. It is managed thus: the hand of the dislocated limb is firmly fixed as closely to the opposite shoulder as it can well be, by cords tied round the waist; between the bend of the elbow and the chest is placed an empty "masak" (a goat-skin water bag, in common use throughout Oriental countries as a means of carrying water), which is gradually filled with water: the weight of this suffices to overcome the resistance of the muscles before they have borne it a quarter of an hour, and the head of the bone flies back to its socket with the usual sound. Most masaks, when full, weigh close upon a hundred weight, and many much more than this.

For a reduction of dislocation of the ankle joint, the injured extremity is placed in a hole dug in the ground and covered over with a soft earth, which is firmly pressed down by stamping The limb is then pulled out by force, with the joint returning to its natural position.

Industrious John Chinaman.

What a truly industrious people the Chinese are! At work, cheerfully and brisk, till ten o'clock at night. Huge piles of linen and under-clothing are disposed in baskets around the room, near the different ironers. Those at work damping and ironing—peculiar processes, both. A bowl of water is standing at the ironer's side, as in ordinary laundries, but used very differently. Instead of dipping the fingers in the water and then snapping them over the clothes, the operator puts his head into the bowl, fills his mouth with water, and then blows so that the water comes out of his mouth in a mist, resembling the emission of steam from an escape pipe, at the same time so directing his head that the mist is scattered all over the piece he is about to iron. The invention for ironing beats the Yankees all to fits. It is a vessel resembling a small, deep, metallic basin, having a highly polished flat bottom, and a fire of charcoal continually burning in it. Thus they keep the iron hot without running to the fire every five minutes, and spitting on it to ascertain by the "sizzle" if it is ready for use. This ironing-machine has a long handle, and is propelled without danger of burning the fingers by the slipping of the "ironing rag." Ladies who use the ordinary flat-iron will appreciate the improvements."

A GENIUS in New Bedford is fitting up a steamer for the purpose of towing icebergs to India, where they sell for six cents a pound. Another proposes to do still better—to fit a screw in the iceberg itself, and thus avoid the expense of ship-building. 'Cute chaps, both of 'em.

IN the Industrial Exhibition at London, thermometers made by Negretti and Zambra, were shown, which were so sensitive that the mercury rose when the hand was held within three inches of them.

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MISCELLANEOUS SUMMARY.

CITY HAYMAKERS.—Such was the surrounding of one city churchyard that I saw last Summer on a Volunteering Saturday evening, towards 8 of the clock, when with astonishment I beheld an old man and an old woman in it making hay. Yes, of all occupations in this world, making hay! It was a very confined patch of churchyard, lying between Gracechurch street and the Tower, capable of yielding, say an apronful of hay. By what means the old man and woman had got into it with an almost toothless hay-making rake, I could not fathom. No open window was within view; no window at all was within view sufficiently near the ground to have enabled their old legs to descend from it; the rusty churchyard gate was locked, the moldy church was locked. Gravely among the graves they made hay, all alone by themselves. They looked like Time and his wife. There was but the one rake between them, which they both had hold of in a pastorally loving manner; and there was hay on the old woman's black bonnet, as if the old man had recently been playful. The old man was quite an obsolete old man, in knee-breeches and coarse gray stockings; and the old woman wore mittens like unto his stockings in texture and in color. They took no heed of me as I looked on, unable to account for them. The old woman was much too bright for a pew-opener; the old man much too meek for a beadle. On an old tombstone in the foreground, between me and them, were two cherubims; but for those celestial embellishments being represented as having no possible use for knee-breeches, stockings, or mittens, I should have compared them with the haymakers, and sought a likeness. I coughed and awoke the echoes; but the haymakers never looked at me. They used the rake with a measured action, drawing the scanty crop towards them; and so I was fain to leave them under three yards and a half of darkening sky, gravely making hay among the graves, all alone by themselves. Perhaps they were spectres, and I wanted a medium.—*Dickens's All the Year Round.*

PLATINUM POROUS.—At a late meeting of the Paris Academy of Sciences, a communication was received from MM. H. Sainte-Claire and Troost, showing that platinum, though apparently a most compact metal, will admit of the passage of certain gases through its pores at a high temperature. To ascertain this, the authors of the paper had caused a platinum tube to be drawn out of one piece, so as to be free from all solder, and to present a uniform and unbroken surface. This platinum tube was introduced into a porcelain one, so that an empty cylindrical space was left all round between the two, properly stopped at each end. Through this space a constant current of hydrogen was made to pass, by means of two glass tubes inserted at the extremities, so as not to allow of the slightest communication with the platinum tube, which was filled with dry air. On exposing this tube to a high temperature, the air by degrees lost its oxygen, and water was formed: a circumstance which could only be explained by admitting that hydrogen had penetrated through the pores of the platinum tube; and, on the temperature being further raised, a considerable quantity of free hydrogen was found to issue from that tube. This shows that platinum, at a high temperature, is capable of producing the phenomena of endosmosis with gases.

MINERS AND EDUCATION.—A very able teacher, formerly a miner, having carefully collected information respecting the state of education among the mining population in a district of nine square miles in Lanarkshire, Scotland, states that only about 60 per cent of the working people can sign their names, but 94 per cent can read easy narratives. Of those who can read, 32 per cent do in fact read little, if at all, but the other 62 per cent do read. 43 per cent read religious works only. 40 per cent have a clear knowledge of the leading Bible truths, can talk sensibly of the current topics of the day, make a good use of what they have learnt, and, by a most exemplary industry and economy, strive that they and their offspring may be well thought of in the community, and come to occupy a better position in society. 50 per cent require to be better instructed in those principles of political economy which concern he mutual relations of capital and labor.

REPAIRING ARMY WAGONS.—A Washington correspondent gives the following account of the wheelwright and carriage department of the army at Washington;—"Every kind of woodwork repair is done here, for all sorts of wagons and vehicles used in the army, including painting and trimming, and, in occasional times of leisure, new wagons are manufactured. All the broken carriages and fragments are brought here from the army of the Potomac; and so closely worked over, that few fragments are left to be conveyed out of the way. The quantity of these broken down, mashed up, and played-out machines that come into this yard daily is on a gigantic scale; and those who see these traps go in such quantities daily into this yard, and disappear for ever, very often without knowing that they do go out daily in the shape of good wagons, express their astonishment that the whole city is not covered over with the fragments.

This establishment employs some 100 workmen, and is under the superintendence of Capt. Wm. Carr, who was at one time foreman of the Concord Railroad Shop.

SALE OF DIAMONDS.—A letter from Lisbon states that the sale of crown diamonds, recently authorized by the Portuguese Cortes, has taken place at the Bank of Portugal. The principal purchaser was M. Bernard, of the imperial diamond-cutters' establishment of France; to whom four of the principal lots of rough diamonds were knocked down for a sum of 1,300,000f. The total proceeds of the day's sale were 1,800,000f. These precious stones came from the mines of Minas Geraes, in Brazil. They were brought to Portugal, as has been stated, by King John VI., in 1821. The value of the diamonds which the crown still has to sell, is estimated at about thirty-five millions of francs. It is said that one rough stone among them will, when cut, surpass in size the finest at present known.

CONGRESS OF MECHANICAL ENGINEERS.—The Liverpool (England) *Albion* states that the Institution of Mechanical Engineers is to meet in that city this month to hold its annual session, which will last for several days, like that of the Association for the Advancement of Science. Papers on important subjects relating to mechanical engineering, are read by the members, who comprise some of the most distinguished men in Great Britain, in all that relates to character, education, and scientific and practical atquirements. About twelve years ago attempts were made to organize such an Association in New York, which led to no useful results.

THE OYSTER CROP.—It is feared the oyster crop this year will be a failure. The beds in the Chesapeake are almost entirely destroyed, and as yet those in the Virginia rivers cannot be approached. Fully half of the boats engaged in the trade have also been destroyed since the war broke out. The Baltimore packers have accordingly declined to make contracts on specific terms.

[We suppose this announcement is put forth "to operate for a rise" as the stock brokers say. It is a remarkable fact that, immediately after these mysterious prophecies, the prices of the articles increase amazingly.—EDS.

SHIPBUILDING IN CHINA.—Some months ago, the keel for a steamer, 300 feet long, was laid opposite Shanghae. As there is not any timber in that part of China suitable for so large a vessel, it was built of teak, Siam wood, and Oregon pine. The engines are from the Neptune Iron Works, New York, fitted up in Shanghae by Mr. James A. Smith. She is in all respects a first-class steamer for the Yangtze river service, and is estimated to carry from 1800 to 2,000 tuns of cargo.

BRINKERHOFF & WOOD'S self-raking reaping machines, took the first and second prizes at the trial of the Durham County Agricultural Society, C. W., on the 24th ult. These machines are American inventions, though they were manufactured in Canada.

THE cotton defenses of Fort Sumter proved a failure. The guns set the cotton on fire. A part of it fell into the sea, and the rest was saved. King cotton could not help his subjects.

HALF a million dollars' worth of pearls have been found this year in the waters near Ceylon.

DIPTHERIA AMONG ARMY HORSES.—A new disease seems to have lately broken out among the horses in some of the army camps. J. H. Thompson, surgeon of the Thirty-ninth New York Volunteers, stationed at Williamsburgh, Va., thus describes its symptoms and effects:—"Four horses died in one battery within a few hours of each other. They appeared well in the morning, refused a portion of their oats at mid-day, and in the evening could not swallow anything; rapid exhaustion followed, and in a few hours they died. On opening the animals, the mouth, larynx, and trachea were found covered with diptheritic membranes somewhat thicker and more tenacious, but in other respects resembling that found in the human subject in cases of diptheria. If this is diptheria in the horse, and I know of nothing else it is likely to be, is it with them a new disease? Or is it only new to me, because I am ignorant of its previous existence? Certainly none of the persons having charge of the Government horses around here know anything of the disease." It is to be hoped that this notice will arrest the attention of scientific veterinary surgeons, and that they will be able to apply a remedy.

JOHN BURNS, over seventy years of age, a resident of Gettysburg, fought throughout the battle of the first day, and was wounded no less than five times, the last shot taking effect in his ankle, wounding him severely. He came up to Colonel Wister in the thickest of the fight, shook hands with him, and said that he came to help. He was dressed in his best; consisting of a blue swallow-tailed coat with brass buttons, corduroy pantaloons, and a stove-pipe hat of considerable height; all of ancient pattern and doubtless heir-looms in his house. He was armed with a regulation musket. He loaded and fired unflinchingly, until the last of his five wounds brought him down. He will recover. His little cottage was burned down by the rebels. A purse of one hundred dollars has been sent to him from Germantown.

COMPOSITION FOR PRESERVING WOOD.—A very good composition for preserving wood which is to be placed in the ground, and subjected to rapid decay, is made with coal tar, quick lime, and ground charcoal. The tar is first heated in an iron vessel; then about a pound each of quick lime and charcoal to every five gallons, stirred among it until the whole has become thoroughly mixed. It is applied hot with a brush, or the wood may be dipped into it. This preparation resists the attacks of insects.

WALKING ON THE WATER.—A person in London recently attempted to walk upon the water, and succeeded. He had an air-tight vessel on his back and another on his breast, both worn under his clothes; he also had small paddles of a peculiar kind on his feet, which aided his progress. These arrangements enabled him to walk on the water with ease. The idea is worth experimenting upon here.

THE number of vessels belonging to the British colonies, is 10,967, manned by 75,934 persons; and 1,107,696 tuns burthen. The mercantile marine of Great Britain consists of 28,440 vessels 4,934,400 tuns burthen; and manned by 228,129 men and boys. There was an increase of 402 vessels in 1862, of 127,574 tuns.

MOTORS FOR STREET RAILWAYS.—Mr. Charles L. Alexander, an inventor, of Washington, D. C., writes us, saying that he has plans for a street railway, to be worked by compressed air, which have been highly approved of by Mr. D. K. Clark, the English engineer. Those interested in the subject would do well to address Mr. Alexander, at Washington.

THE London *Spectator* says that the audience at a Mormon meeting were astonished at seeing small white figures moving mysteriously over the floor. A lady pocketed one of these objects, and found it to be a frog done up in white paper, with the intention of working upon the fears and superstition of the credulous.

THE number of immigrants arriving in New York city is enormous. During the time between March 1st and August 1st, 85,046 arrived, just double the number in the same time of last year.

JAPANESE silk worms, which, it is said, feed on oak leaves, have been introduced in France with good results.

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APPLIANCES FOR CHEESE-MAKING.

Two weeks ago we published on page 85, an article on the "Manufacture of Cheese." The following information upon another branch of the subject, is condensed from an article in the *Ayr* (Scotland) *Advertiser*, by J. Harding, an English cheese-maker :—

"The judicious business man will see that to make the most of his dairy produce requires as much discretion, skill, and attention as to grow good grain and roots ; and therefore will furnish his dairy room with implements and utensils of the best and most useful kind, and a sufficiency of them, so that nothing may be wanting on his part to insure success. It is quite as unwise to be without the proper tools in the dairy as the proper plough and harrow in the field. Thus, there are implements on two distinct principles employed in the first breaking up of the cheese —the small round wire and the flat knife-like breakers, both cutting the mass ; and the revolver mode of round iron rods, and the shovel, made of wood and brass rods, breaking the mass. The latter is far preferable to the former, as, in the hands of a careful operator, it acts as a wedge in a block of wood, cracking and breaking, instead of cutting and pulping. One of the best cheeses, bearing very flattering remarks from the judges, which was exhibited at the Association's first show held at Ayr, was made on this principle, at White Hills ; being broken up by a common hay rake, the handle of which was shortened for the purpose.

" If dairy implements and utensils can be further simplified and improved, and the labor in cheese-making reduced, it is desirable to do so. To thinking minds, as improvements suggest themselves, they will be laid hold of and carried out. We used to keep our cheese in press a week ; then we tried four days, and ultimately three. We used to salt the cheese at several times ; now we salt it in the curd at once. Formerly it was half an hour's work for three or four men and boys to carry the whey every morning from the dairy to the piggery ; now we lay down pipes and turn a tap, and it runs off. I might occupy a sheet in enumerating the improvements which have taken place, step by step, until the making of good cheese has become a respectable and pleasurable employment ; so that I wonder that our neighbors in Wiltshire and Gloucestershire do not follow our example. I was in a dairy not long since where 70 cows were milked. Their daily produce was made up in eight cheeses ; these were kept in the press and salted every day for a week ; six or seven presses were employed to press them, and every morning 56 cheeses had to be turned, and as many vats and cloths to be washed.

" I have been repeatedly asked for my opinion as regards the various mechanical appliances which have been, of late years, introduced in the making of cheese, particularly Keevil's and Cockey's. The former cannot be at all applied to the Cheddar system of making ; but is valuable in making the Wiltshire cheese, as it saves labor and prevents waste. Cockey's is the best and only apparatus which I know to be of service in making Cheddar cheese, and is certainly valuable. It is rapidly spreading over the dairy districts in England. It consists of a boiler, and copper cheese tubs, connected by pipes. The cheese tub is fitted with a double bottom, forming a chamber ; hot water from the boiler circulates in this chambar, heating in a few minutes the night's and morning's milk to the required temperature, thus saving the waste and labor of carrying the milk to and from the furnace for that purpose ; and I think it is not a small advantage to have the milk heated uniformly. By this apparatus the milk of the evening may be kept sweet in the tub. The scalding process is also performed by the heat from the water in the chamber, the breaking and scalding being performed at the same time, the temperature of the mass rising from 80° to 100° during the operation. This apparatus cannot improve the best or first-class cheese, but it probably would that of the second or third class. I have known it to be the case, to the satisfaction and profit of many cheese-makers. Large dairies would do well to use it.

" In my recent visit to Scotland, I saw that in a large number of dairies and cheese rooms the necessary alterations and improvements which the making of Cheddar cheese requires, had not been effected. Although the stables are regularly washed and kept far cleaner than they are in England, where a number of cows are closely housed, there is always an unpleasant smell, which on no account should be allowed in the dairy. The milkers should not be allowed to bring in the milk into the dairy ; but a tin receiver should be placed outside the wall, into which the milk may be poured and conveyed to the cheese tub by a conductor attached. The best place for the cheese room, when practicable, is immediately over the dairy. There is sometimes a difficulty in this, as the dairy should have a north prospect, while that of the cheese room should be south. The sun should be allowed to shine into the cheese room at least once a day ; its light and heat keep the room and cheese more healthy than any artificial means. The window should be furnished with a blind, to exclude the rays at pleasure. Hot water for heating the cheese room is better than a stove. This is effected by Cockey's apparatus, at a small extra expense. The pipes are laid round the room, close to the walls ; the heat, therefore, is diffused behind the cheese, which should be on shelves. This is not the case when the source of heat is in the center of the room, as with a stove. The heating the dairy room is an improvement, and is desirable during the winter months. It is absolutely necessary that good cheese be well kept ; it retains its flavor and comes into the market sooner."

ANIMAL NUTRITION.

The process of promoting growth and sustaining human existence is called "nutrition ;" and the materials necessary to this process are embraced under the general term of food. Inferior animals select their appropriate food with unerring instinct ; but man—"the lord of creation"—if he possesses this faculty in a savage state, seems to be in a great measure devoid of it, when in a civilized condition. Nutrition is an important question ; as it comprehends the nature of food, and its relation to the animal structure. The body of man is continually undergoing change, by respiration and labor. Every blow with a hammer struck by the mechanic, and every step taken by the merchant, causes a waste of animal tissue ; and this wear and tear of the body necessitates its constant repair by nutritious food.

The materials used for food are more numerous than the languages and dialects spoken by the different nations and tribes of men. Oil, wine, beer, cider, milk, coffee, tea, chocolate, and many other infusions are used as liquid food ; venison, beef, mutton, pork, fowl, fish, and numberless solid animal substances are used ; and rice, corn, wheat, oats, barley, rye, and countless varieties of fruits and vegetables. Every country, and almost every family differs from another in the kinds of food which they use. Science has therefore, apparently a difficult task to perform, in seeking to answer the question—"What is the appropriate food of man." She has however made some advances towards its solution.

The human body is composed of certain elements, which are now well known ; and when these are wasted, they must be replaced by similar elements in the form of food. It is therefore self-evident that the substance—whether animal or vegetable—which contains the greatest number of those elements, of which the human body is composed, in suitable proportions, is the best adapted for food ; provided it can be assimilated by the digestive organs. The food required for man has been divided into two general classes ; namely nitrogenous, and non-nitrogenous, or muscle-producing and heat-producing food. The warmth of the body is chiefly maintained by a species of low combustion ; and the food which is required for this action is composed chiefly of carbon and hydrogen, in the form of fat, butter, sugar, starch, &c. All animal tissues, however, contain a large amount of nitrogen ; hence, food which has this element in it, is necessary to repairing the wasted tissues of the body. Chemists have been very active in analysing different substances used by man for food ; and it has been found that, although many of them differ much in taste and appearance, they are nearly similar in composition, and—strange to relate—some vegetable and animal substances are identical ! The constituents of the blood are fibrin, casein, albumen, globulin, fats, oils, sugar, soda, potassium, common salt, and salts of the phosphate of lime, magnesia, and iron. Now an analysis of milk shows that it contains all these elements ; hence Dr. Thomson, F. R. S., Professor in St. Thomas's Hospital, London, says respecting it :— "The primary and original food of man, whatever speculators may say to the contrary, is milk, a fluid of purely animal origin. But if those who are to regulate diet are not guided by scientific knowledge, and do not exercise their judgement, they might be inclined to draw from this fact the inference that the proper nutriment of man is animal food. Observation, however, having proved that animals can subsist upon a vegetable as well as upon an animal diet, and scientific research having satisfactorily demonstrated that the constituents of the two kinds of nutriment, when well selected, are identical, the one-sided position must yield to the light of knowledge."

Scientific writers on physiology, from observation and investigation, seem to have come to the conclusion, viz: that food consisting of about one part nutritive (nitrogenous), to two of calorific (carbonaceous), is about the best proportioned for sustaining the human body ; and the following table has been arranged on this basis, to show the relation between nutritive and calorific vegetable substances.

Milk	1 to 2
Beans	1 " 2½
Peas	1 " 3
Linseed	1 " 3
Oatmeal	1 " 5
Wheat Flour	1 " 7
Indian Corn	1 " 7
Barley	1 " 8
Potatoes-dry	1 " 9
Rice	1 " 9
Arrow-root	1 " 26
Tapioca	1 " 26
Starch	1 " 40

Milk is here placed as the comparative standard. It contains the largest amount of tissue (nitrogenous) matter, and serves admirably for repairing the waste of animal tissue. Beans, peas, oatmeal, wheat, and indian corn, rank high, as most suitable for the vegetable food of men engaged in severe labor. The fine flour of wheat is not so nutritive as wheaten grits, which contain the cuticle of the grain. Starch and arrow-root stand very low with respect to nutriment. These substances are frequently given to children, and taken by many adult persons during warm weather, under a mistaken notion of their nature. Indian meal, finely ground, is more easily digested, and far more nutritive than rice, starch, or arrowroot.

The flesh of inferior animals is suitable for repairing the waste of human tissue ; but there is nearly as much difference in the character of flesh as in vegetables. Pork, beef, and mutton are the most common animal substances used for food. The first contains a proportionally larger amount of calorific to nitrogenous elements, than the others ; and a larger quantity of it is required to repair the waste of animal tissue.

Alcoholic liquors are not nutritious, and are unnecessary to nutrition. Sufficient experiments have been made to determine scientifically their nature and effects upon the human system. They have been proven to be injurious in all instances. Nor are infusions of tea and coffee necessary to nutrition. They contain theine and caffeine, which tend to arrest the rapid decay of animal tissue ; but when taken in excess these increase the activity of the heart, and cause headache. As a general rule, simple food, and a very few dishes at each meal, are more beneficial than feeding on a large number of dishes prepared from intricate receipts. Mixed food —animal and vegetable—appears to be most suited for the sustenance and development of the human frame.

ZINC vessels should never be used for keeping any fluids intended for alimentary purposes, for Vanquilin proved, fifty years ago, that such will contain, after a short time, a considerable quantity of zinc in solution, and it is well known that the smallest amount of zinc will cause violent spasmodic vomiting.

BRITISH STEAMSHIPS.—A return lately issued of the number of steam vessels registered in the United Kingdom, makes the total number 2,192, the amount of register tunnage 535,596, and of gross tunnage 810,588.

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NEW BOOKS AND PUBLICATIONS.

THE NATURAL LAWS OF HUSBANDRY; by Liebig. Published by D. Appleton & Co.

Of all living writers on chemical subjects, Justus von Liebig is the most original and industrious. His published works have led to more close observation, and experiment, and excited more discussion than those of any other chemist. He utters his views with fearlessness, and supports them with a vast amount of research. His work on Agricultural Chemistry, published several years ago, contained what is called the *Mineral Theory;* which holds that the food of plants is obtained from inorganic nature. This theory has been attacked by distinguished chemists, and practical farmers; who have contended that the food of plants consisted of both mineral and organic elements: and that nitrogenous organic manures were the most important. This new work by Liebig will be a treat to our scientific agriculturists. It contains his mature views on agriculture, after sixteen years of experiment and reflection. The fundamental basis of it is still the so called mineral theory. He is rather severe on practical farmers who have derided the teachings of science. He says :—"I have never yet met with an agriculturist who kept a ledger—as is done in other industrial pursuits—in which the debtor and creditor account of every acre of land is entered. The opinions of practical men seem to be inherited, like some practical disease. Each regards agriculture from his own narrow point of view, and forms his conclusions of the proceedings of others from what he does himself." The whole gist of the mineral theory regarding the food of plants, is summed up as follows :—"Plants contain combustible and incombustible constituents. Of the latter, which compose the ash left by all parts of the plant after combustion, the most essential elements are phosphoric acid, sulphuric acid, silicic acid, potash, soda, lime, magnesia, iron, and chloride of sodium. The combustible constituents are derived from carbonic acid, ammonia, sulphuric acid, and water. By the vital process of vegetation, the body of the plant is formed from these materials, which are therefore called the *food of plants.* All the materials constituting the food of our cultivated plants belong to the mineral kingdom. The gaseous elements are absorbed by the leaves: the fixed elements by the roots; the former, however, being often constituents of the soil, may also reach the plant by the roots as well as by the leaves. The gaseous elements form component parts of the atmosphere; and are, from their nature, in continual motion. The fixed elements are, in the case of land plants, constituents of the soil, and cannot of themselves leave the spot where they are found. The cosmic conditions of vegetable life are heat and sunlight."

We consider this volume of Liebig the most valuable (in a scientific sense) ever contributed to agriculture. The nature of seeds and soils, and the treatment and growth of plants, are discussed at length in different chapters; but the most important information contained in it relates to the different kinds of manures, and their effects on soils in relation to the food of plants. The great object of Liebig seems to be to impress upon his readers the importance of the phosphates as manures; and to show the comparative unimportance of organic manures, such as ammoniacal elements. Experiment upon experiment is multiplied to prove his positions. He contends that it is not the ammonia—as has been generally supposed—but the phosphates in guano, which render it so valuable as a manure. Bone dust, and the excrement of animals, are held to be the most essential manures. Perhaps the most instructive and interesting chapter in the book is in the appendix, on Japanese agriculture, which is practical in every respect. In that country, agriculture has been brought to the very highest state of perfection—not so much in implements, as in the treatment of the soil and the manuring and care of plants.

JAPAN HUSBANDRY.—We quote as follows from this chapter :—"The educated farmer of the old world, who has insensibly come to look upon England, with its meadows, its enormous fodder production, and immense herds of cattle—and, in spite of these, with its great consumption of guano, ground bones, and rape cake, as the beau ideal, and the only possible type of a truly rational system of husbandry—would certainly think it most surprising to see a country even much better cultivated, without meadows, without fodder production, and even without a single head of cattle: either for draft or fattening; and without the least supply of guano, ground bones, saltpeter, or rape cake. This is Japan. The Japanese peasant holds fast to one indisputable maxim, viz: without continuous manuring, there can be no continuous production."

In Japan the farms are small—about five acres each in extent—and the only manure-producer is man. His excrements are collected with scrupulous care; and in the cottages of the poorest peasants, the excrement cabinets are kept neat and cleanly. Along the highways and footpaths of that country, stoneware receptacles are placed in the ground for the use of travellers. The excrementary matter is mixed with water, and applied in a liquid form; for the Japanese farmer knows no other mode of using it than by top-dressing. With an area, about equal in extent to Great Britain and Ireland, Japan sustains a far larger population, and exports considerable quantities of food to other countries; while England is compelled to import annually many millions of bushels of wheat, and many tuns of beef, butter, pork, and other provisions. In agriculture, therefore, nations which esteem themselves highly civilized may receive instruction from the Japanese, whom they consider barbarians.

SUPPLEMENT TO URE'S DICTIONARY OF ARTS, MANUFACTURES, AND MINES. Edited by Robert Hunt, F. R. S. Published by Appleton & Co., New York.

No work on the useful arts, manufactures, and mines, is more deservedly popular than this dictionary by Dr. Andrew Ure. The author possessed rare qualifications for such a production: and it is held to be a standard authority. But so rapid is the progress of discovery and invention in this age, that many processes and modes of manufacture are continually becoming obsolete, being superseded by improved methods and new developments. Hence the necessity for frequent editions of, or supplements to, the best standard publications. Dr. Ure being "gathered to his fathers," the preparation of a supplement to his dictionary was committed to Mr. Robert Hunt, who has executed his task with much credit to himself and some of his co-laborers, whose names are given with their contributions to its pages. So varied and extensive are the subjects treated in this large volume, that we can notice but a very few of them.

INDIA RUBBER FABRICS.—It is stated that, had Dr. Ure been aware of the practical efforts of Goodyear in America, and Hancock in England, he would have been eulogistic of those inventors. The credit of having discovered the mode of vulcanizing India-rubber (one of the most wonderful and meritorious inventions of any age) is given to the late Mr. Charles Goodyear, of New Haven, Conn. It is thus described :—"The general method is to incorporate sulphur with caoutchouc, and submit it to heat. If any particular form is required, the mixture is placed in moulds, where it takes any delicate design that may be upon them, and if these are submitted to higher degrees of heat, a very hard, horny, and strong substance is produced, called hard India-rubber, or 'Vulcanite.' Mouldings, gun stocks, combs, cabinet work, and hundreds of other articles may be obtained by these curious means. Steam heat is usually employed for vulcanizing in England; but in America, ovens for vulcanizing with dry heat are generally used." We understand that the dry heat produces the best qualities of India-rubber goods. The permanently elastic character of vulcanized India-rubber is thus set forth;—"Mr. Brockedon subjected a piece of vulcanized India rubber, 1½ inches thick, and of 2 inches area, to one of Nasmyth's steam-hammers of 5 tuns. It dropped upon it with a fall of 2 feet, without injury; then the hammer fell upon it from a hight of 4 feet, when the cake was torn, but its elasticity was unimpaired." Vulcanized India-rubber withstands heat up to 300° Fah.

GALVANIZED IRON.—The method of galvanizing iron with a crystalline surface, is described as follows :—The sheets of iron are immersed in a warm bath of dilute muriatic acid; scoured bright with sand or emery, and then washed. A large wooden tank is then filled with a dilute solution of muriate of tin—two quarts of the muriate being added to 300 gallons of water. A layer of finely-granulated zinc is first laid upon the bottom of the bath; then a cleaned iron plate is laid upon this; then a layer of granulated zinc, then another plate, until the bath is filled. The zinc and the iron constitute a feeble galvanic battery; and the tin in the solution is deposited upon the iron, in a thin skin, after immersion for about two hours. The tinned plates are then lifted, and drawn slowly through a bath of molten zinc, covered with a layer of sal-ammoniac, which becomes pasty. Machinery is used for drawing the plates through the bath. The plates take up a very smooth layer of zinc, which, owing to the presence of tin beneath, assumes its natural crystalline character, giving the plates an appearance resembling that known as the *moiree metallique."*

The volume is a handsome folio of 1,096 pages, beautifully printed on fine paper, and illustrated with 700 wood cuts.

Tar for Preserving Building Materials.

An interesting communication from Fred Kuhlmann has been published in *Comptes Rendus der' Academie des Sciences*, relating his experience in the application of tar to materials for building. The following extracts are condensed therefrom :—

"Gas-tar has become of very general use in the towns of the north of France, to protect the basements of the houses from the effects of the external damp; but they have not yet been able to prevent the damp from rising in the interior by the effect of the capillarity. In my factory of chemical products I make a more general use of this tar still. I apply it hot upon all the exterior walls of the ovens, for decomposing salts, burning pyrites, concentrating sulphuric acid, &c.; and I impregnate, by immersion in boiling tar, the tiles destined to the covering of roofs, particularly of those where there are any acid vapors produced.

"In England, in the soda factories, where the hydrochloric acid is generally condensed in chimneys, or towers containing coke kept constantly wetted by a stream of water, the flagging which serves as a base to these towers, when it is of a porous nature, is immersed in hot tar before it is laid down. In other circumstances, the tar is used to color tiles made of porous clay for general use.

"I had occasion to examine the rapid progress of decay that was taking place in the porous sandstone of the chapel of St. Eugenie, on the borders of the sea, at Biarritz. The stones of this chapel, whose construction only dates from the year 1858, are profoundly corroded on all the points exposed to the wind, and I observed this peculiarity in the stones, which, before being put in place, were marked with oil color, in black, that the parts covered with the color were protected against alteration, so that the numbers now stand out in relief with great distinctness. These figures in relief, in which the preservation of the stone was secured by the merely superficial application of the greasy or resinous matters, made me think that, in a number of cases, the bitumens and resins might be made to play a very useful part in the preservation of buildings or sculptured decorations, if, instead of applying them to the surface, they were made to penetrate into the interior of the stones without decomposing their surface. I have made numerous essays to assure myself of the possibility of this penetration, by employing pitch derived from the distillation of coal-tar. I cause to be boiled in it, stones, carved and rough; bricks, objects made in clay, simply dried in the open air, without being burnt or varnished. These are boiled in vessels of cast or wrought iron, and I thus obtain a penetration of the pitch to a great depth, and with that a considerable degree of hardness and a perfect impermeability. These properties would render such materials essentially fitted for the construction of the foundations of houses, for the coverings of walls, for hydraulic works, and particularly to those exposed to the sea air. I have also formed with hot tar, and some mineral substances in powder, pastes that are more or less fusible under the effects of heat, according as they may contain in their composition more or less tar; and which are susceptible of being molded, with or without compression, into bricks, tiles, and architectural ornaments of every kind.

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The matter whose incorporation has afforded the best results is the oxide of iron resulting from the combustion of the pyrites, and which, when mixed with a quarter of its weight of tar, yields a paste which presents a hardness and a sonority that are very remarkable."

Correspondence

Manufacture of Paper---Injustice to American Inventors

MESSRS. EDITORS.---In the *Prairie Farmer*, of July 18, I notice the letter of "An American on English Agriculture," in which a great ado is made over the fact that Cobbett made paper from corn husks in 1828. He says: "And so Mr. Cobbett, in England, 35 years ago, first made good white printing paper from the husks of his first crop of Indian corn!" And again: "And I, not being his (Cobbett's) malignant calumniator, will hold up the page of his book for all people in their imaginations to see the first white paper ever made from corn husks." And again: "To Cobbett ought to belong the credit of inventing corn paper." And then, to make this discovery appear still more marvelous, he exclaims: "How much was known, even of straw, as a material for the coarsest of wrapping, for paper, in the year 1828?"

Now, sirs, I do not know who this correspondent is; but, from his reference to the International Exhibition, &c., together with the fact of his travelling in that country, I suppose that he must be a person of some consequence—perhaps some agent or delegate, sent over to represent our country abroad; though I hope not, for the credit of our country: for surely a man could not better expose his ignorance of the subject upon which he has been writing, or do greater injustice to his own country, than he has in the above statements. Instead of the credit of that invention belonging to Cobbett, or any foreigner, it belongs to Americans, and was patented in in this country more than a quarter of a century before Cobbett made his experiments! In 1802, a Patent was issued by the U. S. Patent Office to Burgess Allison and John Harkins, of New Jersey, for making paper from corn husks! So you see that it is purely and wholly an American invention. Another patent was issued in this country to Homer Holland, of Westfield, Mass., in 1838, for preparing corn husks for making paper, and many others since.

In his reference to the first use of straw for making paper "Z. K." is still more inaccurate. Instead of being comparatively unknown for that purpose in 1828, it had been used for making paper in Germany as early as 1756! A work was published by Jakob Christian Schoffer, in 1765, on over sixty specimens of paper, all made from different materials and without rags; among which was brown corn, wheat straw, saw-dust, moss, beech, willow, aspen, mulberry, clematite, hornet's nests, pine, hop-vines, peelings of grape vines, hemp, leaves of aloes, lilly of the valley, moth root, barley straw, cabbage stumps, thistle stalks, burdock, Bavairan peat, &c. In a later American work, "Chronology of Paper and Paper Making," by J. Munnsell, Albany, 1857, a list of one hundred and three different articles is given, from which paper has been made. In 1819, Reaumer suggested making it of wood; and paper was made from basswood bark, in France, in 1775; it has also been made of various kinds of wood, in this country, of late years. Not many years since, the New York *Tribune*, for a brief period, was printed on paper made of basswood. Among the most successful and curious efforts of this kind, is the making of paper from the southern cane. The cane is put into an iron cylinder, and steam forced in under great pressure, penetrating and filling the pores of the cane. Suddenly one end of the cylinder is opened, the cane is shot forth as out of a cannon, when the sudden expansion of the steam in the pores bursts the cane into fine fibers, after which it is easily reduced to pulp and converted into paper. The Baltimore *County Advocate* was printed on such paper, made by H. Lowe, of that city, in 1856. It is, however, usually made into wrapping paper.

The first paper-mill in this country, of which we have any account, was owned by William Bradford, at Elizabethtown, N. J., in 1728. A patent (charter) was granted the same year by the general court of Massachusetts, for a paper-mill which went into operation in 1790, and was the first in New England. In 1790, the nearest mill to Albany was at Bennington, Vt., from which the paper was brought on horseback! It was in that year that the wife of a papermaker, in England, accidentally dropped her blueing bag into a vat of pulp, and thus originated the blue paper, which, when taken to London, brought an advance of four shillings a bundle, for the reason that he claimed that it was an improved paper, the consequence of which was, that he presented his wife with a costly cloak on his return!

Paper can be made from all those vegetable fibers which have a corrugated edge, and may be macerated into a pulp with water. It is not because it was not known that paper could be made of straw, wood, husks, &c., that these have not been more generally used; but because it is too difficult and expensive to make it of them. Straw, and other such substances, contain too much silica, and its separation is too difficult; hence its use is not generally profitable. Silica gives to straw its stiffness and brittleness, being of the nature of rock crystal or flint; and hence it is that soils deficient in silica produce straw that is too limber and weak to stand alone—a fact well known to farmers.

The great inventions and improvements in the manufacture of paper have not been and cannot be, so much in the discovery of new materials as in improved processes and machinery for the preparation and manufacture of materials already well known. Formerly the manufacture of paper was almost entirely by hand; and, in 1798, sheets of paper made in France, 12 by 50 feet in size, were considered wonderful. Now nearly the whole process is mechanical, and single sheets have been made, in a few days' time, that would reach around the globe! The greatest of all inventions in paper-making machinery was doubtless the Fourdrinier machine, invented originally by Louis Robert, of France, in 1798, and perfected by Mess Fourdrinier, of London, who, it is said, expended $300,000 upon it, and finally died in want, a few years since. The invention consisted in having the pulp fed upon an endless, revolving wire-gauze belt; and thus made in a continuous sheet of any length. Other mechanism is also used for pressing, sizing, drying and cutting it into sheets of any required size.

The origin of paper made from pulp is not clear; though it is, doubtless, a Chinese invention, and at least 1,800 years old. The manufacture of paper from cotton is supposed to have been introduced by the Arabians, from Tartary, about the year 704. It was made at Mecca in 706, and in Spain, France and England in the eleventh century. Paper was first made from linen about 1,200, A. D.

The consumption of paper in this country, in 1852, equalled that of France and England combined. In 1854, we had, in this country, 750 mills, producing annually, 250,000,000 pounds of paper, worth $25,000,000. In making this, 405,000,000 lbs. of rags, worth 4 cents per lb., were used. In ordinary times, from half to three-fourths of a million dollars worth of rags are imported annually, mostly from Italy and Austria. Since the rebellion began, the price of paper, and of rags, as well as the importation of the latter has greatly increased.

The amount of paper used by some of our newspaper establishments, is enormous. For instance, the New York *Tribune* consumes 30 tuns a week—making about 570,000 sheets—considerably over half a million! The London *Times* uses 90,000 sheets daily. Rees' "Cyclopaedia," published in Philadelphia in 1822, consumed 30,000 reams, and is said to be the most extensive publication in the English language.

The truth of all these statements, and many others equally interesting, in relation to paper, can be ascertained without going to England.

D. C. W.

Washington, D. C., Aug. 3, 1863.

[The first paper-mill in America was erected in 1714, upon Chester Creek, Delaware, by Mr. Wilcox, and is still in operation, we believe, for manufacturing hand-made paper.—EDS.

The Accident on the Naugatuck.

The *Naugatuck*, United States Steam revenue Cutter, lost her large rifled gun on the 5th instant, under the following circumstances:—It appears that the vessel was got under way for the purpose of giving the gun's crew some exercise in target practice; and, upon reaching the spot designated, the gun was loaded and shotted with the ordinary charge of powder, and the solid shot which is usually fired from that gun. The first discharge was made; and, although the gun was examined according to usage, no symptom of weakness was apparent. It was again loaded, and at the instant of firing, a terrific explosion occurred, prostrating nearly every one on board, blowing one man overboard, and making sad havoc about decks. It was found that the entire breech of the gun had been blown out, and that this heavy mass of iron had been forced through the pilot-house, the smoke-pipe, deck-house, and cabin; and then, going some distance astern, fell into the water. Only five persons were injured to any extent, the others escaping. The gun in use at the time of the accident was an old-fashioned navy 42 pounder, which had been rifled, and a very heavy brass reenforce shrunk on. In this case the charge and the shot were well "home," the gun was very clean, the elevation was not excessive, and the accident was purely attributable to unforeseen causes. This is the second time that the gun of this vessel has exploded; the first was a 100-pounder rifle gun, which was blown to atoms while the vessel was engaged with the rebels at Fort Darling, on the James River.

Concerning Milk.

A curious custom prevails among the milkmen of Mexico, it is said, of driving their herds about the streets, and milking them to order, "in large or small lots to suit purchasers." The live animals themselves are driven from door to door of the different regular customers, where they are milked, and there is a regular stand where the transient patrons are supplied, by milking into the vessel in which they take it home. Besides a drove of calves, with the cows all muzzled, running and bleating after them, there is a gang of goats and asses driven along, that people may always suit themselves as to quality and price, as also their different tastes—for which there is no accounting. It is impossible to derive the reason or origin of this mode of vending milk; unless it arose from the natural villainy of the people, and their distrust of each other---it being a preventative against adulteration, and of their disposing of a quality of milk inferior to that represented. This plan has at least the merit which attaches to honesty and fair dealing. We should not like to see the cows from which city milk is obtained driven about the streets. Such a sorry lot of lean kine as would be exhibited, would create an unpleasant sensation in the customer. We are credibly informed that the swill milk trade still exists, and that large quantities of it are sold.

FRENCH ARMOR PLATES.—The London *Times* states that 250 tuns of armor plates have been received at the Portsmouth dockyard from France, having been obtained by the British Admiralty from Messrs. Petin, Gaudet & Co., the makers of the armor plates for the frigate *La Gloire*, and other iron-clads in the French Imperial Marine; 100 tuns are of 4½ inches, and have been purchased by the Admiralty at £45 per tun. The remaining 100 tuns are of 5¼-inch, the price being £5 per tun. Compared with English plates these have a rough and unfinished appearance; and English manufacturers have complained that the Admiralty would not receive such from them. French armor plates have been received in this city for the Italian frigates now building by Mr. W. H. Webb. They are well finished, and the metal is excellent in quality.

A NEW NARCOTIC.—At a recent meeting of the Royal Society of Tasmania, a quantity of "Pitcherry," a narcotic plant brought from the interior of Australia, where it is used by the natives to produce intoxication, was produced by a gentleman, who remarked that on one occasion Mr. King, the explorer, swallowed a small pinch of the powder, the effects of which he described as being almost identical with those produced by a large quantity of spirits.

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Oscillating Engines.

The most superficial examination is sufficient to prove that the modern steam-engine is not a creation, but a growth; and this not alone in the development or application of principles, but even in the smallest matters of merely mechanical detail. What we may call the science of construction was little understood a hundred years ago. Our ancestors could build large castles or cathedrals; a good-sized ship was not beyond their powers. Anything, in fact, which depended for success on the laws of statics, and had no moving parts, throve pretty well under their hands; but when it came to machinery, the case was different; and, from a watch to a flour-mill, all was more or less rough, cumbrous, heavy, and ill-constructed. We believe things would have remained in much the same state to the present day, had not the steam-engine exercised such a demand on the skill of our working population. Its introduction, too, opened a wide field for the application of machines, most of which depended as much for success on finish as the engine which was to give them motion. We find, in the different forms under which steam machinery presents itself to our notice, an almost perfect record of the progress made by the arts since its invention; and it is highly improbable that anything but the very simplest arrangements, would strike early inventors as capable of general application. Thus, a working beam had been used, centuries before steam was thought of, for pumping and raising buckets from wells; and it was really the best contrivance Newcomen or Watt could possibly have used for the purpose they had in view. Almost the moment, however, that steam was employed to cause rotation, the defects of the beam system became apparent; although it was many years ere a different form of engine was generally employed. We of the latter half of the 19th century will perhaps say that the abolition of the beam was so obvious an improvement, that the inventors of the direct-acting system deserve little credit for originality. Easily said, when, Columbus-like, the egg is made to stand for us already; be this as it may, the oscillating cylinder, at all events, has crept more slowly to perfection than almost any other arrangement.

The first idea of the kind is doubtless due to Richard Trevethick. In a patent dated, March 24, 1802, to Trevethick and Vivian, they describe a vertical sugar-mill, worked by an engine on this principle. But they go rather farther with their notions than the known merits of the system would justify us in following; for they propose that, not the cylinder alone, but boiler, grate, and chimney, should all swing on a vertical axis; the fly-wheel axis being vertical also, of course. Their patent, however, includes a claim for a cylinder on the modern principle. The invention met with little notice at the time.

Witty took out some patents from 1810 to 1813 for movable cylinders. But the first oscillating engines ever really made, were constructed by Aaron Manby, of the "Horseley Works, Staffordshire, in 1821. Many of these engines were set to work with more or less success. The valves seem to have been the great source of trouble; and the difficulties entailed by the want of a good means of regulating the inlet and outlet of the steam, proved a powerful obstacle to the more general adoption of the oscillating system, until two 10-horse power engines, fitted with slide valves, nearly as now, were erected on board the *Endeavor*, a steamboat plying between London and Richmond, by Messrs. Maudslay and Field, in 1828. Messrs. Penn subsequently undertook the construction of this class of engine on the largest scale, and under their skilful hands it has received improvements which cause it to rank as one of the very best forms of paddle-wheel engine we possess; indeed, it is far from improbable that, after a little time, paddle steamers will be fitted with this class of engine exclusively; as its peculiar arrangements are admirably suited to the enormous cylinders and slow-speeded pistons which such vessels require. Oscillating cylinders, weighing over 20 tuns, are by no means uncommon.

It is a little strange that a form of engine so well adapted to cramped situations has not as yet been employed to any extent to drive the screw. Several geared engines have been fitted with it—the *Great Britain*, for instance; but we believe we are correct in stating that it has been very sparsely, if at all, employed to drive the screw shaft direct. We cannot see any objection to its use for such a purpose, for which, indeed, it seems exceedingly suitable: especially on board narrow vessels, where it is difficult to get room for a long stroke or connecting rod. No difficulty should be experienced with the valve gearing; and the cylinders, if horizontal, would of course balance pretty fairly on their trunnions. By such an arrangement, a great deal of weight would be saved in guide blocks, fixed guides, cross-heads, double piston rods, &c.; to the amount of many tuns, perhaps, in large engines. The whole system has been too well tried on the largest scale, to admit of much doubt of its success on one much smaller, if not less powerful. What we should lose or risk by its introduction for the purpose is not very apparent; and it is quite certain that we should, at all events, gain a long stroke and a light engine; advantages great enough to entitle the question to some thoughtful consideration.—*Mechanic's Magazine.*

[In this country, very many instances of the application of the oscillating cylinder to the screw-propeller are familiar to us. On the Northern Lakes, there are numbers of propellers driven direct by cylinders of from 30 to 60 inches in diameter, by 4 feet stroke A favorite plan with some firms is to place the cylinder as high from the keel as possible, without endangering the stability of the ship. We know of some engines with a stroke of 36 and 40 inches, which have piston-rods 14 feet long. The vibration of the cylinder is thus materially lessened. Another method is to place the cylinders on a long iron frame, inclined to the keel at an angle of about 36°; the condensers and air-pumps being in the space under the cylinders. Still another design is employed for single cylinder engines, in stationing the cylinder at the extreme side of the vessel, and the air-pumps and condensers on the opposite side, worked from the crank-wheel, by connecting-rods and bell-cranks, or their equivalents. In many cases rotating valves, triangular in section, but round on the face and seat, have been used with tolerably good results.—Eds.

English System of Engineers' Certificates.

A correspondent of *Mitchell's Steam Shipping Journal* says:—Will you kindly allow me a small space in your paper to give publicity to the injustice suffered by engineers who wish to obtain certificates as to their efficiency. It is now required that captains of steamers shall employ only such engineers as hold certificates; and the ability of an engineer is estimated by the class of certificate he may hold. By this, we would expect that the best engineers would have first-class certificates; but such is not the case. The man who can make, keep in repair, drive, and understand an engine thoroughly, and who has been to sea some years in the Coasting Trade, stands no chance for a certificate, unless he has been employed in a vessel with engines of 110-horse power or more. The law on this point does not take into consideration that there are as good engineers in some of the smaller, as in the larger steamers; but, what is still worse, many who have no claim whatever to the title of engineer, further than having been promoted to that position from fireman, obtain first-class certificates as engineers. They might certainly become engine-drivers, but to call them engineers is a misnomer. Now, such a state of things is a wrong, both to owners of steamers and to engineers; for such a recommendation as a first-class certificate from the Board of Trade is a dangerous agent in the hands of men whose knowledge of engineering extends only to firing a boiler. It is unjust to engineers who are unemployed, on account of a "fresh supply" coming into the market; and dangerous to owners of vessels, on account of men being entrusted with their property, of which they have but a very imperfect, if indeed any, knowledge of the management. In case of a break-down at sea, what is to become of a steamer that carries a certificated engine-driver? Theory is of little use in such cases. Practical men are wanted in steamers at sea.

[It is rather novel to engineers in this country to learn that the captain of a vessel has anything to do with hiring the engineers. With us, the owners of the ship hire the chief, and he engages his own assistants, down to the last coal-heaver. Certificates are no test of engineering skill in any country; either in the navy or out of it. They are merely vouchers for a certain amount of theoretical or technical knowledge, which the first heavy gale, or a break-down, may show the uselessness of. Theory is well in its way; but without practice it is of no value whatever. Certificates simply comply with the law; but all the "papers" in the world cannot make a careless man careful, or a stupid one "sharp."—Eds.

Sustaining Animal Life.

The life of an animal may be described chemically as a process of oxidation; the tissues of his body are continually undergoing combustion; he is constantly breathing out carbonic acid gas, and thus deteriorating the ocean of air at the bottom of which he lives and moves; so that, were not a counteracting influence at work, he would, during each moment of his existence, be working his own destruction. This counteracting influence is exerted by vegetables, whose life is chemically characterized by a change opposite to that of the animal; that, namely, of deoxidation or reduction. Animals take up oxygen, and give off carbonic acid; plants reverse the process: they take up carbonic acid and give off oxygen, and thus the composition of the atmosphere is maintained in equilibrio.

The animal derives its power from the forces locked up in the vegetable organisms which constitute its food, and of which it builds up its tissues. The animal cannot create force; he can only direct its application; he cannot move a muscle without a certain given quantity of force being changed, without a certain portion of his tissues undergoing oxidation, an amount which is regulated by the grand principle of the conservation of force—so that the total energy which the animal exhibits is regulated by the same laws which apply to the work of the steam or electro-magnetic engine. Every pound of carbon burnt to carbonic acid in the animal body, evolves heat enough to raise the temperature of 8,080 pounds of water 1° Fah., centrigrade, or can produce a mechanical effect sufficient to raise 2,784 tuns one foot high.

The source of the power of the animal is the force which has been accumulated by the plant. The animal world cannot continually withdraw energy from the plant, unless the latter receives as continual a supply. The source of this energy is the sun; the plant sucks up or absorbs the rapidly vibrating solar radiations, and stores them up to be given out again in the various forms of energy when the vegetable tissue is destroyed by oxidation. It is only in the presence of the sunlight that the true function of plant life can be exercised. It is the sunlight which, acting on the green coloring matter of leaves, decomposes the carbonic acid of the air into its constituent elements; enabling the plant thus to assimilate the carbon and to turn the free oxygen back into the air.

Test for Olive Oil.

It is a well known fact that the olive oil sold in America and elsewhere is very seldom pure, but is mostly adulterated with other cheap, vegetable oils. M. Hauchecorne, chemist, of Yvetot, France, has, however, just discovered an easy method of detecting such frauds. M. Hauchecorne's test is oxygenized oil, which may be had at any chemists, and is a colorless liquid. The method of using it consists in pouring a portion of the oil to be tested into a graduated tube, by which the volume of the liquid is ascertained at a glance. To three volumes of olive oil, one volume of oxygenized oil is added, and the whole well shaken. After a few seconds the mixture will become green, if the oil is pure olive. No other oil will do so. Poppy oil will assume a rose color with the test; oil of sesamum will turn bright red; oil of arachnis turns yellowish grey; and beech-nut oil takes the color of ocher. These are the oils most commonly used to adulterate olive oil. When the latter is pure, the green tint appears instantaneously; but if adulterated, the liquid must stand three or four minutes before the color, whatever it may be, appears. Even the quality of the olive oil, when pure, may be tested in this way. Thus, an apple-green color shows that the olives employed were too ripe. A light green denotes oil obtained from a mixture of olives of different qualities, but none of them spoilt. The olive oils of Nice, Port Maurice and Genoa, belong to the former sort; those of Aix and Grasse to the latter.—*Medical and Surgical Reporter.*

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Improved Car Brake.

From an examination of the list of patents granted since the commencement of the present rebellion, it would seem, to the superficial observer, that the inventive genius of our people has been lately engrossed in the perfecting of inventions for the destruction of human life. This is an erroneous view of the case; and the tools, apparatus and utensils, devoted to the prosecution of the peaceful arts, have received a due share of attention.

Among the many claimants for public favor—as furnishing a desideratum long sought for, by the traveling public and railroad companies, is the invention of D. Myers, of South Bend, Ind., of an improvement in railroad car brakes, for which Letters Patent were issued on the 23d day of December, 1862, and January 21st, 1863—both through the Scientific American Patent Agency.

The operation of the patent brake, herewith illustrated, has been practically tested, and has received the approbation of railroad authorities and others who have seen it in operation. It is simple, durable, economical, and effective, and combines novelty and excellence to such a degree that it must supersede the present system of brakeing trains. For the benefit of railroad officials and the traveling public generally, we present a few of the principal features of this improved brake, as detailed by the inventor. It is so constructed that by its use the engineer or fireman is enabled to control his train at will, regardless of the speed or momentum. The arrangement for graduating the power is so perfect and complete that a sufficient amount of power can be applied to slide all the wheels of the train; or it may be applied in any lower degree, checking the progress of the train gradually, or otherwise, as the occasion may require. At the same time the power can be gaged, preventing the application of an excess, and effectually guarding against the breaking of chains, rods, &c., which arrangement is of inestimable value, as will be readily perceived by those who are familiar with continuous chain brakes. Another advantage consists in the novel combination friction wheel, and its susceptibility of being attached to the baggage car, instead of the engine and tender. This location of the friction wheel is of two-fold advantage; when the friction power is derived from the engine, each and every engine drawing passengers must be provided with an attachment, which, being somewhat expensive, is attended with much inconvenience, as the wheel cannot be attached without causing detention, and interfering with the regular running of the engines. But with the brake the difficulty is wholly avoided; and it is claimed that its cost is only about one-fifth of that of any other brake now in use. The peculiar construction of the combination on the coaches is such as to cause the chain and rod connection to relax readily, the relaxing power being always in proportion to the number of the cars in the train. This combination does not interfere in the least with the working of the hand-brakes, it being wholly independent of them. We give a brief description of its mechanical construction and operation. From the inside end of one of the trucks of the baggage car, Fig. 1, the ordinary brake-bar is removed, and, in its stead, is placed an iron shaft, *a*, three feet long and two and a quarter inches in diameter, which is suspended by suitable hangers. On the end of said shaft is placed a combination friction wheel, *b*, which, by means of a horizontal lever inside of the truck, and a rod and chain connection from the same, to an inclined lever *c*, inside, of the baggage car, is forced against the car wheel, causing the friction wheel to rotate and wind on its shaft, one end of the continuous chain, *d*, which extends through the entire train, the other end being fastened to the rear end of the rear car. By this power drawing on the chain, the two pendant levers, *e e*, under the middle of the baggage car, are drawn together. The longest one of these levers has a rod connecting it with the horizontal lever under the baggage car, which lever is attached to the rod that connects the two perpendicular levers on the trucks. The combination on the coaches (see Fig. 2) is operated by the tension of the continuous chain,

Fig. 1.

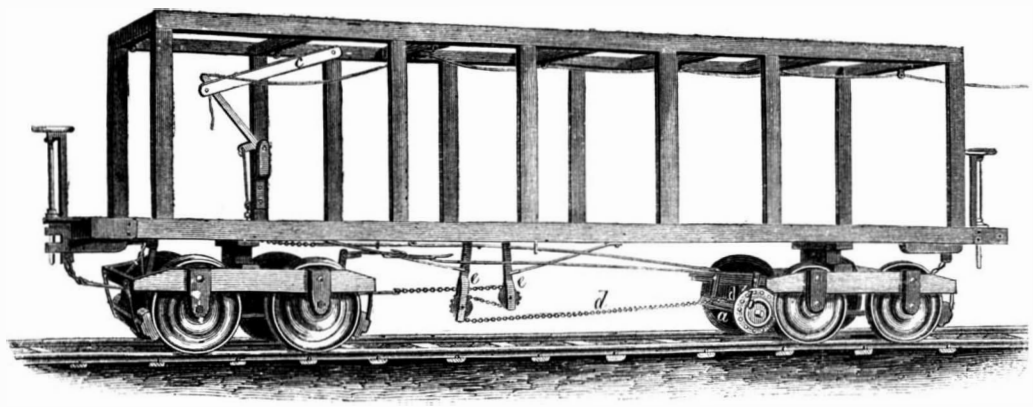
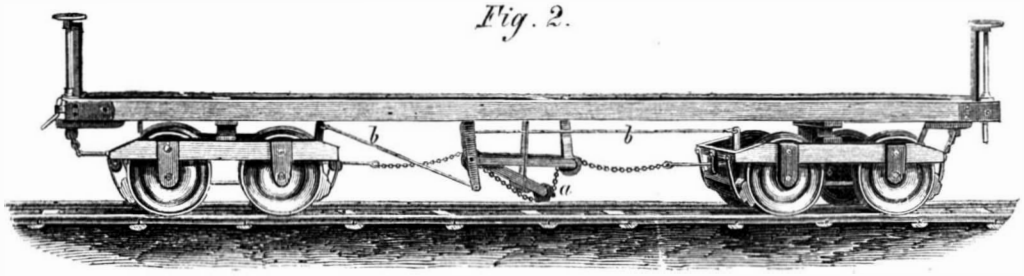


Fig. 2.



MYERS'S PATENT RAILROAD CAR BRAKE.

drawing the same in a straight line, raising the lower pulley, *a*, thereby changing the position of the triangular lever, and drawing on the rods, *b*, attached to the upper and lower ends of the same, and connecting them with the perpendicular brake levers on the trucks, which applies the shoes to the car wheels in the same manner as by the old method of braking. The engineer or fireman operates the brake by means of a cord, which leads from the inclined lever in the baggage car to the engine cab. Further particulars may be learned concerning this invention by addressing Myers, Miller & Co., South Bend, Ind.

SUINE'S CULINARY BOILER.

It is a fact well known to all housekeepers, that many substances, while cooking, give off odors which are very offensive to the sense of smell; and which permeate all through the house, in spite of every effort to confine them to their proper locality. Of these, cabbages, onions, and some other vegetables and meats, furnish ready instances in point. Not only is this true, but where there are a large number of boilers on the stove, undergoing the superintendence of the cook, a great amount of vapor is given off; and the atmosphere of the kitchen is usually as cloudy as a fine day in England. This discomfort is experienced to a very great extent on "washing day;" and the horrors of that period have been set forth with great earnestness, by persons who have conceived antipathies against that necessary institution. The subjoined engraving is a representation of a new boiler, lately invented; which is designed to obviate the evils above mentioned, and add materially to the comfort and neatness of housekeeping. It is very simple, being merely the addition of an upright tube, A, fitted to the side of the boiler, and provided with a perforated top, through which the steam escapes into the flue of the chimney, by the aperture, B. The cover is placed on this boiler as usual; and the vapor is let off into the stove, instead of into the room, as previously mentioned. The tube can be attached to any boiler, new or old.

This invention was patented through the Scientific American Patent Agency, on June 30, 1863, by P. L. Suine, of Shirleysburg, Pa. For further information address as above.

Army Bread versus Hard Tack.

A correspondent of the *Vermont Phenix*, alluding to an article on the above named subject, which appeared on page 57, current volume of the Scientific American, and was copied by our cotemporary, gives vent to his experience as follows:—"I see in your paper an article from the Scientific American, on Army Bread, stating that our soldiers are less healthy than the rebels, because we eat hard tack of poor quality, baked in bad gases, while they have corn meal. My experience leads me to say that the bowel complaints so common, especially in the Department of the Gulf, are caused in a different way from that given. The hard tack of the army I have found not only abundant, but sweet and good; it is, however, *hard tack;* being probably the worst substance to chew used as human food. Sea biscuit and Navy bread are pulpy in comparison. Few men have been long in service without breaking out more or less front teeth and grinders in cracking the rations, which cannot be crumbled or softened. Meals, too, are often taken in a great hurry, or while marching, and the hard tack cannot be dipped in coffee or fried in fat to become smoother, though perhaps not more digestible; so that, in general, these stony, almost metallic lumps, pass into the soldier's stomach every day, and go down undigested, causing dyspepsia and inflammatory diseases of the bowels.

"Hard tack is good, with this qualification: it can't be chewed; and is fit only for that generation mentioned by Solomon, whose 'teeth are as swords, and their jaw teeth are as knives.' So it is with good reason that our judicious Board of Enrollment exempt drafted men for loss of teeth. A cartridge can be torn with the thumb nail, but no gums can manage our army bread as now furnished.

"If it were softer, it would spoil in the hot damp climate of the South; and the only thing is to have young men whose 'grinders have not ceased because they are few.'"

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NEW YORK, SATURDAY, AUGUST 22, 1863.

AGRICULTURAL STEAM ENGINES.

Many modern improvements in mechanism have greatly multiplied production and economized human labor. Thus, by the labor of one person with the sewing machine, twenty stitches can be executed in the same space of time as one stitch by hand, and labor-saving results fully as great, have been effected by the spinning-frame and several other machines. But the chief feature of mechanical improvement consists in the application of new powers as substitutes for manual labor. The soil, for example, may be cultivated as well with the spade as the plow; but with the latter, drawn by two horses, labor nearly equal to that of twenty men is performed; hence it economizes human toil to this extent. Grain can be cut as well with the cradle-scythe as with a reaping machine; but with the latter, operated by animals, human toil is economized to an extent equal to that effected by the plow. A step still higher in the application of mechanism, is its adaptation to be driven by water power. The torrent, leaping over the rock, is applied to grind our grain, saw our lumber, and weave our cloth. But higher and greater than these two powers, is that of steam applied to mechanism. It is not confined to certain localities, like water, and its concentrated energy enables man to achieve results more resembling the feats of the fabled Titan's than those of human beings. In the steamship the power of three thousand horses is exerted in a very limited space, to drive the vessel across the ocean; while, on land, a locomotive, drawing a common express train, exerts a power exceeding that of three hundred horses. Steam is the most economical, versatile, and potential power ever brought into the service of man. It has been estimated that the steam power of the world now exceeds that of three times the adult male population of the globe. We believe this is not an exaggerated statement; and it affords some idea of the vast productive powers which are subject to the will of man. But although it has been applied to drive almost all kinds of machinery, there are several departments of industry in which it is scarcely used at all. The most extensive of these is agriculture, in which steam power has not hitherto been required to any extent, because animal labor has been so abundant and comparatively cheap, in the rural districts. But it appears to us that a time is approaching when many of our large farmers will be compelled to turn their attention to steam power, for performing many operations on the farm. It has been calculated that the present war has devoured about one hundred thousand horses and mules; and perhaps as many more will perish before the contest is ended. In many parts of Virginia, Maryland, Kentucky, Tennessee, and Missouri, and in some sections of Pennsylvania, Ohio and Indiana, the farmers have had all their laboring cattle swept away; and their farms cannot be cultivated without such animals or some substitutes for them. Necessity, therefore, may compel many farmers to apply steam engines as partial substitutes for the animal power of which they have been deprived. This is a subject to which their attention and that of steam engine manufacturers should now be directed. When it can be used with economy, a steam engine is preferable to horse power. When an engine accomplishes the day's labor, it requires no further attention; and, when not working, it consumes no food, and needs no attendant. Farm engines should be simple and strong, and there is undoubtedly much room for improvement in their construction, so far as relates to securing economy of fuel. The energy of one pound of coal under combustion is equal to 6,000,000 pounds lifted one foot; but the work performed by common portable engines, of about ten-horse power, is only about 495,000 pounds, lifted one foot, with a pound of coal. It is possible to build a portable engine for farmers which will exert a horse power for each two pounds of coal consumed per hour; but engine builders must take a considerable step forward in the way of making improvements before they secure such economical results.

A MOST SENSIBLE JURY.

We have read with great pleasure the report of a jury recently impanneled in the city of Lowell, Mass., to hold an inquest on the body of a person who was killed by the explosion of a steam boiler in that place. These gentlemen, without befogging themselves with so-called "scientific" discoveries, went straight to the fountain-head of the disease that causes so many boiler explosions—carelessness—and their finding was as follows:—"The jury find that the cause of the explosion was not from a lack of water, but by a pressure of steam greater than the boiler was intended to bear, or was necessary for driving the engine and machinery; and that this excess of pressure was owing to a want of care required by the kind of fuel used, and to the incompetency, from ignorance, of the person in charge of the boiler. And the jury also find that the steam-gage and safety-valve did not indicate the amount of pressure on the boiler; but were so mismanaged and out of order as to be wholly untrustworthy. And the jury also find that it was the practice of the engineer to leave the boiler, to do other work away from, and out of sight of the boiler, and for longer periods of time than was consistent with a proper care and management of the same. The jury are of the opinion that the too prevalent practice of employing, from motives of economy, inexperienced and otherwise incompetent persons to have charge of steam-boilers, is one almost sure to be attended with calamitous results, and calls for legislative action."

There are at this very moment, in this city, numberless establishments where the very same practice is carried on, that is—hiring an engine-driver, and compelling him to do other work in the intervals of firing. Where such a course does not result in immediate disaster, or a sudden explosion, it is sure to occasion a most wanton waste to the proprietor's property.

It is unnecessary to say that no thorough-bred engineer would ever engage himself to do the duties which are required of many engine-drivers: between the two terms there is a vast difference. Employers would consult their own interests more effectually by hiring every person to fulfill some specific duty with which he was familiar, and not engage men who are known as "Jack at all trades, but master of none." It is as much as most individuals can do to master a standard trade in a lifetime; and the lives and property of the community ought not to be put in jeopardy by the avarice or carelessness of a few.

CONSTRUCTION AND REPAIR.

The life of a machine depends measurably upon two things—its construction, and the usage to which it is subjected; all others are subordinate. Admitting this, it is palpable that the better a machine is made, the greater credit will belong to those who constructed it. But in sending away machines from the workshop as finished, mistakes and oversights are sometimes committed, that redound injuriously to the maker's reputation. Theoretically, the mechanical minutiæ of the best locomotives present a model which should be emulated, and copied into other forms of mechanism all over the land. To be explicit—the closely and accurately-fitted gibs and keys in the connecting rods of locomotive engines, the neat manner in which the brasses are fitted to their several places, the tight joints, the reamed holes, and steady pins, in addition to the security derived from screw bolts, for preventing parts from shifting out of line with each other, should be more generally adopted as mechanical practice than it is. Of course, all machinery will wear out, sooner or later. Every tool has its allotted period of service; but the time of its utility may be very much lengthened by the manner in which it is put together. Cheap tools are not always cheap. They may be sold at a low price, but they are continually breaking down, and require renewing so often that the outlay upon them in a short time equals the value of a first-class article. Tools to be cheap must be well made; then they will last for years at a small expense for repair. Our steam fire engines have been praised in England, on account of their superior finish, and general excellence of workmanship; but those sent out were not by any means the finest we have, being only a sample; the "Manhattan" in particular having been in constant use nearly four years. We cite this fact as going to show the attention everywhere paid to good workmanship; and the important bearing it has upon the reputation of the maker, and the performances of the machines themselves.

We have been sorry to remark, in some parts of the country, a general inattention to the well-established mechanical laws and rules (not scientific, but practical ones); as, for instance, putting a $\frac{5}{8}$ bolt into an $\frac{11}{16}$th hole; drilling holes too large which were to be tapped; putting rough bolts into reamed holes; using threads of too coarse pitch, and similar acts, professionally improper and irregular, which should not occur. We make these remarks in no captious spirit, but with an earnest desire to see our manufacturers, all over the country, avail themselves of the skill and improvements of others; believing that by so doing they will in the most direct manner serve their own interests.

THE COAL QUESTION.

Some facts bearing on this subject are difficult to account for, when reasoning by the laws which are usually supposed to govern trade. It appears from the reports of the several coal companies, that there have been 1,196,163 tuns of coal mined, this year, in excess of that produced for a corresponding period of the past twelve months. In the face of this fact the price of the article is very nearly double what it was a year ago, and the prospects of a decline are very uncertain indeed. We are, on the contrary, informed that consumers may be glad to purchase coal at the present rate, and that upon the advent of cold weather the price will be largely increased. It is difficult to reason calmly when reviewing this subject, and as for the inevitable laws of supply and demand, they are disposed of altogether. We are told that the quantity required by the Government is one cause of the high price, and that the difficulty of obtaining miners to work the drifts, is another. To refute these arguments, the published reports show an actual increase, by the miners who won't work, of more than 1,000,000 tuns. These are large figures. We should like to know what it is that the Government is doing that it has not done two years ago, which requires such very great amounts of coal? The blockade has not been extended; the ships upon it have not been materially increased in number; no large expeditions are on foot; the iron for the iron-clads is pretty well under way; and it is a mystery to us what becomes of the supply. At this season it is common for families and dealers to lay in a quantity for the winter, and at the present prices, from $7.50 to $8.50 per coal-dealer's tun, it will take a round sum to prepare for the cold weather.

THE HEAT—HOT, HOTTER, HOTTEST.

Up to the time of going to press the heat continues unabated. Men seek, wearily, the coolest side of the street, and go about their duties with faces as red as boiled lobsters, Human nature seems resolving—not to dust again, but liquefying to water. The stages and rail cars in the morning are loaded down with a panting crowd, who, unable to endure the fatigue consequent upon the exertion of walking, stifle in the omnibus and car, where they are as thickly packed as herrings in a cask. The thermometer records 94° in the cool parts of the city, and the heat within close and small dwellings, is absolutely unendurable. Night brings no relief from the sultry air of the day; and between the high temperature and the musquitoes existence seems a burthen. Anything relating to the arctic regions is pleasant food for thought, and the

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ice business is a nice one. Just at present the companies have declared a great scarcity of the article, and have cut off supplies so that they actually refuse to sell at all except to old customers. We are informed by those who know, that there is plenty of ice in the usual storehouses, but that the dealers are operating for a rise. There is, of course, no law against such a proceeding, but that which ordinary business integrity and fair dealing should suggest. The discomfort entailed upon healthy persons is considerable, but the suffering of the sick, unable to obtain a cooling draught, must be great indeed. At this present writing—9 A. M., August 11th—the thermometer marks 84° in the coolest part of our office—a very slight reduction from yesterday at noon.

While the Dog Star rages, it is well to avoid all excesses, physically and intellectually, and live as near like hermits as possible. The city and country abounds with green fruit, than which there is no more active agent for inducing summer complaints of all kinds; avoid it in all shapes and you will escape unharmed. Drink sparingly, keeping the mind tranquil, and the return of more invigorating weather will refresh and build up enfeebled frames.

NEW KIND OF REFRIGERATOR.

Ice is so scarce, and the price so high, at present, that comparatively few persons can afford to pay for it. In this exigency, a correspondent makes the following suggestive inquiry :—"Would it be practicable to make a refrigerator on the principle of evaporation that would be capable of maintaining its temperature sufficiently low for practical domestic use? Could not one be made of earthenware, the temperature of which might be reduced by the use of sulphuric acid, to a low point; and could it not be made sufficiently cheap to be accessible to persons in country towns where ice is not generally preserved?"

We believe that refrigerators formed of porous earthenware may be made and used with satisfaction without requiring ice. Of course ice is the most convenient and acceptable cooling agent, but when it cannot be obtained, or is too expensive, porous earthenware refrigerators may be substituted. The natives of oriental countries keep their water in porous earthenware vessels, from which they obtain cooling draughts. By placing a porous vessel containing water in the sunshine, and sprinkling water upon its surface, the water inside will become almost ice-cold. Evaporation produces a cooling effect upon surrounding objects; and the water in the porous vessel has its heat abstracted by the above evaporating process. This principle may be applied to a refrigerator. A refrigerating porous filter is illustrated and described on page 412, Vol. IV. (old series), SCIENTIFIC AMERICAN.

The following is a list of mixtures which may be useful to our readers :—

First—Muriate of ammonia, 5 parts; nitrate of potash, 5 parts; water, 16 parts. In such a mixture as this the thermometer sinks 40°.

Second—Nitrate of ammonia, 1 part; water, 1 part. The thermometer sinks 46°.

Third—Sulphate of soda, 5 parts; dilute sulphuric acid, 4 parts. The thermometer falls 47°.

With the use of ice or snow, other mixtures may be made, in which the thermometer will fall 50° below zero; but we have given those which may be employed when snow or ice cannot be obtained. The salts for these mixtures should be fresh, dry, and reduced to a powder before being used. The vessel in which they are dissolved should be thin and a good conductor.

The Perils of English Railway Travel.

Late English papers contain some shocking accounts of the condition of railway travel in that country, as relates to the safety of passengers shut up together in the narrow apartments of the coaches, called cars. It would seem that the danger lies in conveying, indiscriminately and without previous knowledge of each other, persons closely confined in small apartments, and cut off from all communication with the outer world. The guard appears to restrict his duties to locking the passengers in at the several stations, and to exciting the wrath and derision of small boys: and is so far from exercising any other protective supervision over the unfortunates who travel by rail, that if criminals, or lunatics, happen to be shut up in the cars, and take a fancy to rob or murder their fellow-passengers, they exercise the whim as it seizes them, without let or hindrance. Such cases have actually occurred, and the press is very naturally calling attention to the matter. Here is the latest outrage of this kind :—

"A Mr. McLean and a Mr. Worland, took seats in a second-class carriage, by the Friday night express, from Liverpool to London. In the same compartment were a moody-looking Irishman and an elderly woman. He now and again talked to himself somewhat fiercely, and seemed to be threatening an invisible foe. Mr. McLean and Mr. Worland glanced at him, and then continued in friendly chat. Now, it happened that the man had been insane, and was rapidly growing insane again. A wild notion was fast acquiring the strength of a fixed idea. The two men, in familiar chat, were thieves planning how they could rob him, and he was resolving to be first in the field. As soon as the train had left Bletchley, the maniac drew a knife and stabbed Mr. Worland in the head. He drew back his arm to repeat the stroke, when Mr. McLean, who seems to have had his wits about him, knocked him back into his seat. Springing up, the maniac made another dash at the now insensible Worland; but here he was foiled again by McLean, who gripped his throat and his armed hand, and a close combat began. All the time the train flew rapidly through the country. The woman sitting near the other window had done all she could to alarm the driver, by wasting her screams on the morning air, and now lay insensible from the effect of terror. The madman drew the blade of his knife through the fingers of McLean, and thrust with it wildly. Worland had now regained his senses, and he at once entered into the combat, getting behind the madman, and throwing him down. The maniac's yells were louder than those of the woman; they were continuous, but neither guard nor driver heard them. For 40 long miles this scene lasted, seen by none except those engaged in the strife; until a ticket-collector, hastily opening the door, saw the two gashed and haggard men bending over the exhausted madman on the blood-stained floor."

We make a great outcry in this country if the door of the car be shut, if we desire it opened, or if the window is closed by some unfortunate rheumatic against our wishes. But we may well spare our complaints and grumblings, and thank fortune that the stupidity of English railway directors is not visited upon us. If John Bull wishes to improve the safety of his railway travel, let him import American cars, and he will have no more robberies and murders.

Spare the Little Birds.

We have often had our patience sorely tried by the sight of great overgrown boys and men, armed and equipped contrary to law, for slaughtering the small birds that flit about our dwellings and make the groves vocal with song. To any thinking person such a practice is as absurd as it is inhuman; for what can be more foolish than to see a great hulking fellow pause, deliberate, then steal cautiously up, and fire at a little wren or chipping bird that he might hold in his hand? Such an achievement is a wonderful display of sportsman-like qualities, and if persisted in will breed a race of Nimrods of which the world never saw the like. We think, however, that boys, in particular, shoot birds more from thoughtlessness than any other motive; and they should be restrained from so doing by their parents and others who have influence over them. If children of large and small growth will only reflect a moment, they will see that the bird in the bush, is in a literal sense, worth a dozen in the hand; for the former delights us with its song, and does a world of good to the farmer, in destroying worms and other insects; while the dead ones are only little silent heaps of feathers, that speak of nothing but the wanton cruelty of their slayers. A writer in a cotemporary thus expatiates on the value of small birds in the economy of nature :—

"The spring proves the importance of the question whether our small birds shall be preserved or exterminated. This year the caterpillars were never known to be more numerous or more voracious. In many districts the small fruit is almost destroyed by them, and gardeners are forced to employ boys to pick them from the trees. This, of course, cannot be so well done as by nature's scavengers, the birds. In my own garden I have none, and the apple trees are covered with worms of two or three kinds, which have destroyed most of the buds and the young fruit. The effect of the universal tendency to destroy the small birds will be yearly more disastrous, unless active measures are taken to check the evil. At present these useful—nay, indispensable creatures, are at the mercy of the half educated men who shoot them, entrap them, and poison them; boys are allowed by their parents to rob their nests, and thus destroy what, in the great scheme of nature, is of more value than themselves. In my own neighborhood, where (as I have observed) insects of the most pernicious kinds were never more abundant, a lady has, this spring, poisoned with strychnine, at one dressing of her grounds or gardens, no less than 800 birds of various kinds; and she was, a few days since, preparing for a second destruction. To counteract this senseless and barbarous extirpation of our best friends, by man, woman, and child, I look to the schoolmasters and the clergy; who, as yet, seem not to have been fully convinced of the importance of the subject."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Improved Projectile.—This is an improvement made by C. W. Stafford, on his celebrated sub-caliber projectile. Its peculiar structure, and the high velocity which may be imparted to it, adapt it to penetrate the heaviest metallic armor, and it carries into the aperture, so made, a mass of incendiary or explosive material; which, being ignited and discharged within the opposing structure, effects the complete destruction of the latter. The patentee's address is New York city.

Gas Engine.—The object of this invention is to use petroleum or other hydro-carbon liquids for the purpose of giving motion to the piston of an ordinary cylinder without the use of a furnace. The invention consists in the employment for the purpose of producing a direct motive power, of petroleum, naphtha, or other hydro-carbon, in the form of vapor, mixed with a sufficient quantity of atmospheric air to sustain combustion in such a manner that, by igniting said vaporized hydro-carbon liquid in the cylinder, the desired reciprocating motion of the piston is effected. The invention consists, further, in the arrangement of a double cone, the inner cone being provided with a concave top, and its surface being covered with cloth or other absorbent material, and the outer cone being made adjustable in combination with the cylinder, in such a manner that, by the suction of the reciprocating piston in the cylinder, a current of air is caused to pass through between the two cones, where it is brought in contact with the liquid spread over the absorbent surface of the inner cone, and thereby saturated with the vapors of said liquid, and that a mixture of air with vapor is thereby produced capable of being ignited by an electric current. The invention consists, finally, in the arrangement of one or more layers of wire gauze in the induction ports of the cylinder between it and the gas mixer, and in such a manner that the fire is prevented burning back. Oscar H. Kratze, of Leipsic, Saxony, is the inventor, and the patent has been assigned in full to F. F. Mangelsdorf, care of Metropolitan Gas Light Company, New York.

Coal burning Furnace.—This invention consists in placing a partition within a furnace, in such a position as to divide the furnace into two compartments, one for the fuel and the other to receive the products of combustion, and arranging the throat or passage which forms a communication between the two compartments, in such a relative position with the fuel that the smoke and gases must, in their passage to the flues, pass through a portion of the fire and be brought in contact with oxygen supplied from a pipe at the throat, whereby a perfect combustion of all the inflammable products of combustion is obtained, The invention also consists in the employment of a man-hole and damper, arranged in such a manner that the flues of the furnace are rendered accessible,

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and a convenient damper also obtained to admit of a direct draught in kindling, &c. G. G. Hunt, of Quincy, Ill., is the inventor of this improvement.

Propelling Vessels.—This invention relates to the placing of one or more screw propellers in a passage or tube extending longitudinally through a vessel below the water line. The first part of this invention consists in the gradual enlargement of portions of the said passage or tube next the ends of the vessels, in funnel shape and in such a manner that the mouth of the said passage or tube at either end of the vessel presents an area of opening equal or approximating to the whole area of the submerged transverse section of the vessel at an average draft, so that the propeller or propellers working in the said passage or tube, may draw from the front of the vessel, through the said passage or tube, a column of water the area of whose transverse section is equal or approximating to the area of the greatest submerged transverse section of the vessel. To carry out this feature of the invention, the submerged portion of the vessel is made with its sides and bottom straight, or nearly so, and its sides parallel, or nearly so, so that its transverse sectional profile is of the same form, or does not vary in any considerable degree, from end to end, and the funnel mouths of the passage or tube which extends through the vessel are made to conform to the said profile, and combine therewith to make the ends of the vessel present as sharp edges as possible, so that as little resistance as possible may be offered to the passage of the vessel through the water. The vessel thus constructed and provided with propellers, is not forced through the water by dividing and displacing it in a lateral and downward direction, but displaces the water from its front by drawing it through its central passage, and discharges it astern. The invention further consists in placing within the aforesaid passage or tube extending through the vessel, a series of stationary feathers or wings so arranged that, without interfering with the movements of the screw propellers, they will prevent the whirling motion of the water within the said passage or tube, which would otherwise be produced by the revolution of the propellers or check in a very great degree any whirling motion that might be produced, thereby greatly aiding the propellers by causing them to draw and force the water in or nearly in direct lines right through the passage or tube. The above improvement has been also patented in Europe. We noticed, a few days since, the death of Frederick W. Harris, of Montreal, C. E., the inventor of the above.

Gun Carriage.—The principal object of this invention is to prevent guns used on shipboard from getting adrift, either while in use or at any other time, and thereby injuring the crew, and to this end it consists in so combining the axle bearings with the carriage and with the tackles for working the gun, that when there is no strain on the said tackles the body of the carriage rests directly upon the bed with the wheels free, but that by the act of hauling on the tackles to run the gun in or out, the weight of the gun and carriage is brought upon the wheels, so that the carriage will run freely. It also consists in the employment, for so combining the axle bearings with the carriage and tackles, of a novel system of double wedges and levers. R. H. Long, of Philadelphia, Pa., is the inventor of this improvement.

Backing Electrotypes.—For the purpose of backing electrotypes, two styles of pans are used at present, one known as the open and the other as the closed pan. With the open pan sound plates can be produced, but it is impossible to determine either the correct thickness of the plate, there being no gage to effect this purpose, or to guard it against distortion of face by shrinkage; the closed pan is provided with a reliable gage to determine the thickness of the plate, but the metal cooling from the ends, it is liable to shrink in the middle, and an uneven and unsound plate is the result. The pan which forms the object of the present invention differs from the ordinary closed pan, in that the interior or upper pan is perforated throughout its surface with minute holes. The end attained by this simple contrivance is, that all inclination to shrinkage in the electrotype plate proper is done away with, as a constant flow of liquid metal is kept up from the upper to the lower plate, until the lower plate is solidified, the metal contained in the upper pan, being naturally the last to cool, and a sound plate of a uniform thickness throughout is the result. W. A. Leggo, of Quebec, C. E., is the inventor of this improvement.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING AUGUST 4, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,370.—Manufacture of Boots and Shoes.—Elias Alexander, Providence, R. I.:

I claim, first, forming the front and back of boots and shoes each in a number of pieces, formed and arranged substantially as herein described, to effect the purpose specified.

Second. I claim the two side seams, f f, in combination with a removable piece or pieces forming the vamp of a boot or shoe, substantially as described for the purpose specified.

Third, I claim the two seams, d d, in combination with a separate piece, C, inserted in the back of a boot leg, substantially as described for the purpose specified.

Fourth, I claim, in combination with an opening in the front of a boot extending from the toe to the ankle, as set forth, two or more separate lacings, 1 2 3, the lapels, L L′, and the strap and buckle, N N, substantially as described for the purpose specified.

Fifth, I claim the heel, R, composed of a number of horse-shoe shaped lifts, V, of leather, and a top either with or without an interior support, substantially as herein shown and described, for the purpose specified.

Sixth, I claim forming the outside counter, M, of boots in two or more pieces, substantially as described for the purpose specified.

39,371.—Leather Paper.—Stephen M. Allen, Woburn, Mass.:

I claim, as a new article of manufacture, a factitious leather or a leather paper, which I denominate tibrilla leather, consisting of leather scraps and vegetable fibre combined, substantially in the manner hereinbefore set forth.

I also claim combining leather scrap steeped in warm water previous to being immersed in alkaline solutions, with the unrotted and reduced fiber of flax, hemp or other like vegetable fiber, substantially as hereinbefore described and for the purposes set forth.

39,372.—Cupola Furnace.—Robert Barckley, Philadelphia, Pa.:

I claim the doors, D and D′, hinged to the base plate, A, of a cupola in combination with the levers herein described, or their equivalents, for elevating the said doors, and permitting the same to be depressed, as herein set forth.

39,373.—Car Coupling.—Elisha T. Barlow, San Francisco, Cal.:

I claim the tongues, B, provided with mortises, F F′, and fitted in the draw heads, A A′, in combination with the oscillating pins, D, connected to springs, A*, and the pin-elevating plates, E, all arranged to operate as and for the purpose herein set forth.

39,374.—Grain Separator.—Charles R. Barnes, Muncy, Pa.:

I claim, first, The adjustable slide or stop, f, raised or lowered by the screw, h, or equivalent, in combination with the main tube, A, and receptacle, B, in such a manner that the draught is divided, a portion passing above and a portion beneath said slide, whereby such dust as falls with the foul seed, in the receptacle, is drawn up on the opposite side, substantially as herein specified.

Second, In combination with the narrowing receptacle, B, and the adjustable slide, f, as before described, I also claim the automatic weighted valve, E, operating substantially as herein set forth.

Third, In combination with the adjusting slide, f, I also claim the register, r, for regulating the draft, and adapting the machines to cleaning of different kinds of grains, substantially as described.

Fourth, I also claim the arrangement of the main tube, A, receptacle, B, adjustable slide, f, weighted valve, E, deflector, c, and register, r, substantially as and for the purposes herein set forth.

39,375.—Stump Extractor.—J. Beachler, Anderson, Ind. Ante-dated Dec. 8, 1861:

I claim the sliding blocks, a a, to which the wheels, C C, are attached, and the rods, d d, crank, e e, shaft, D, arms, f f, in combination with the rods, g g, draught-rod, D, and holding pin, i, all arranged and operating as and for the purposes herein set forth.

[This invention relates to improvements in machines for pulling up stumps, roots, &c., for clearing land; and it will be readily understood by reference to the claim.]

39,376.—Magneto-electric Telegraph.—George W. Beardslee, College Point, N. Y.:

I claim the magneto electric engine connected with the electro magnets operating a vibrating magnet or armature, substantially as herein described, in combination with a mechanism substantially as described, which, as the operator indicates or designates a character or sign which he wishes to transmit, will operate the magneto-electric engine, and thereby develope the electric impulses which transmit such characters or signs, as set forth.

I also claim, in combination with the combination first herein claimed, the employment of the escapement, or the equivalent thereof, operated by the vibrating magnet or armature, substantially as herein described, to indicate or develope the character or sign transmitted, as set forth.

39,377.—Case for Packing Bottles.—Rosanna Carpenter, Roxbury, Mass.:

I claim an improved packing case, having mortises and divisional board, combined and arranged in it, substantially in manner and for the purpose or purposes hereinbefore specified.

39,378.—Self-acting Boiler Feeder.—Franklin D. Boyle, Evansville, Ind.:

I claim the combination of the chambers, A B, valve, C, float, D, pipe or passage, E, chambers, F G H, valves, I J, and pipe, M, the whole arranged to operate substantially as and for the purpose herein specified.

[This invention consists in a certain novel system of valves, chambers and passages, the whole governed by a float connected with one of the valves, for the purpose of effecting a properly regulated supply of water to a steam boiler.]

39,379.—Self-acting Apparatus for Supplying Boilers with Water.—V. Florantine Cleuet, Paris, France:

I claim the self-acting apparatus for supplying boilers with water, constructed and acting substantially in manner hereinbefore described and illustrated in the accompanying drawings.

39,380.—Machine for Planing Shingles.—J. R. Cluxton, Russellville, Ohio:

I claim the platform, K, the boards, B and F, the adjustable clamps, G, the regulating screws, V V, in combination with the cam, G, the whole arranged in the manner and for the purpose set forth.

39,381.—Wool-carding Machine.—Joseph Davis, Wilton, N. H.:

I claim a carding engine, so constructed that each of its waste-preventing rollers, a b c, &c., which are arranged beneath the main card cylinder, shall have, while in operation, a speed or velocity of revolution greater than that of that roller of the series which may be immediately in advance of it, the same being for the purpose as hereinbefore specified.

I also claim a carding engine as not only constructed so as to have waste-preventing rollers, a b c, &c., arranged underneath and so as to operate with the main card cylinder, A, in manner and for the purposes above explained, but as having one or more other such rollers, t u, arranged so as to operate in a similar manner with the "licker in" or "tumbler" B, the whole being substantially as specified.

39,382.—Machine for Bending Metals.—Cornelius H. Delamater, New York City:

First, I claim in machines for bending metal the arrangement of the rolls, B C D and E, and of suitable means of adjusting the same, substantially as and for the purpose herein set forth.

Second, I claim, in machines for bending metal containing four rolls arranged substantially as herein above described, the employment of the rod, G, with its several wedge-formed portions, g g, adapted to act uniformly on the several bearings of the lower bending roll, C, by a single adjustment in the manner and with the advantages herein set forth.

39,383.—Horse-rake.—Samuel L. Denney, Christiana, Pa. Ante-dated April 2, 1863:

I claim, first, The cast hollow spindle, A, with its arm, D, and detent, E, attached thereto, in combination with the connection, O, lever, F, spring, S, releasing sword, I, and serrated rim, G, when constructed and arranged in the manner and for the purpose set forth.

Second, The guards, B, constructed in the manner and for the object set forth.

39,384.—Armor Plate for Land or Marine Batteries.—Frederick P. Dimpfel, Philadelphia, Pa. Ante-dated Oct. 16, 1862:

I claim the interlocking tongued and grooved T-iron plates, constructed and applied together substantially as described, as a defensive armor for casemates, and other similar war structures, and for the clothing or construction of vessels, as set forth.

39,385.—Heater.—Thomas Dowling, of Lynn, Mass.:

I claim the combination of the series of pipes, e e, (arranged within the external smoke chamber as specified) the fire chamber, A, the smoke chambers, B C D, the air chambers, G O, and the concentric air chambers or passages, E and F, the whole being substantially as above described.

I also claim my improved air and smoke damper, and its peculiar arrangement with respect to the pipe, d, and the air inlet, o, thereof, the said damper being made with a flexure and with the two plates or covers, p q, and arranged within both pipe and inlet, as shown in Fig. 1, and as hereinbefore described.

I also claim the combination of the air inlet, n 1, with the air space, m, and the damper, k, made in manner and arranged within the pipe, d, substantially as specified.

39,386.—Seed Planter.—James K. Dugdale, Richmond, Ind. Ante-dated Dec. 27, 1862:

I claim the arrangement and combination of the above-described apparatus, composed of the sliding hoppers, B B, cut-off plate, D, sliding on rods, H H, springs, E E, and set screws, G G, as described and for the purposes set forth.

39,387.—Apparatus for producing Olefiant Gas.—William Elmer, New York City. Ante-dated May 13, 1863:

I claim constructing the apparatus for producing pure olefiant gas and oxide of zinc, by arranging contiguous and indirect connection and communication with the retort, A, for containing granulated zinc, and the pre-heater, Z, for converting naphtha or benzole and water into vapors and arranging and combining therewith the several gas pipes, D F K N M P Q, cocks, I H P, cylinders, G L, and reservoir, O, for performing the respective functions before described; the several parts operating distinctively to produce the desired results, substantially in the manner herein set forth.

39,388.—Producing Illuminating Gas.—William Elmer, New York City. Ante-dated May 3, 1863:

I claim the production of pure olefiant gas from benzole or naphtha and water, in conjunction with zinc, by pre-heating the former substances so as to form vapors, and bringing said vapors into contact with a certain quantity of metallic zinc, heated to the requisite degree, as herein set forth.

Also the continuous process in the manufacture of olefiant gas, in which the gas is not decomposed; and the production of oxide of zinc by the decomposition of the vapors of water, as herein described.

39,389.—Clod Crusher.—John G. Ernst, York, Pa.:

I claim the combination and arrangement of the stationary teeth, B′ B′ and B B, secured to frame-work, A A, shafts, b and C, wheels or cutters, E E E E, and wheels or cutters, d d d d, when constructed and operating as and for the purpose described.

39,390.—Collar for Ladies and Gentlemen.—Franklin Field, Troy, N. Y.:

I claim a collar having a stiffening strip or cord, A, secured in the edge of the collar by being first stitched to the cloth of the collar, and then having the layers of cloth turned over the cord or stiffening strip and fastened together, substantially as herein set forth.

39,391.—Pump.—John Goland, of Batavia, Ill.:

I claim the valve, B, in the bottom of the cylinder, A, in combination with the hollow piston, C, provided with the valve, D, and perforated at its upper part, as shown at f, all arranged to operate as and for the purpose set forth.

[This invention relates to an improved pump of that class in which a tubular piston rod is employed, and which is designed to be used submerged, or at the bottom of the well. The invention consists in the employment or use of a valve at the bottom of the pump-cylinder in connection with a hollow piston provided with a valve and perforated, and all arranged to operate in such a manner that a continuous stream will be forced up through the tubular piston-rod, as the piston is worked up and down.]

39,392.—Infants' Pedo-motive.—Edward J. Gorham, Bangor, Maine:

I claim my improved infants' pedo-motive, as constructed, with its saddle made and arranged within and applied to the stand, substantially in manner and so as to be adjustable as hereinbefore described.

39,393.—Method of producing Gas from Water.—W. H. Gwynne, White Plains, N. Y.:

I claim producing gases for heating and lighting and other purposes by decomposing highly heated and finely divided jets of steam by means of anthracite coal, substantially as herein set forth and described.

39,394.—Apparatus for Marine Propulsion.—Frederick W. Harris, Montreal, Canada:

I claim, first, The enlargement of the passage or tube which contains the propeller or propellers, in a funnel form towards the ends of the vessel, in such a manner that its mouth at either end of the vessel presents an area of opening equal or approximating to the whole area of the greatest submerged section of the vessel, substantially as and for the purpose herein set forth.

Second, The funnel-mouthed passage or tube, in combination with the straight and parallel sides and straight bottom of the vessel, substantially as herein described, for the purpose set forth.

Third, Making the mouths of the tube conform to the transverse profile of the sides and bottom of the vessel, so as to unite therewith in a sharp, or as nearly as practicable a sharp edge, substantially as herein set forth.

Fourth, The wings or feathers, E E, arranged within the tube or passage and in combination with the propeller or propellers; substantially as and for the purposes herein specified.

39,395.—Clock Escapement.—William Hart, Mayville, Wis.:

I claim, first The arrangement of the impulse pallet, b, detent, f, lever, c, wire, d, or its equivalent, and stop pin, e, in combination with each other and with the pendulum rod and escape wheel, to operate substantially as herein specified.

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Second, The guard, g, applied in combination with the detent lever C, to operate substantially as and for the purpose herein specified.

[This invention consists in a certain novel arrangement of an impulse pallet and detent, in combination with a pendulum, whereby the pendulum has the power applied to it directly from the crown wheel, and many other advantages are obtained.]

39,396.—Hoop Skirt.—David Hawkins, Birmingham, Conn.:

I claim a hoop skirt so constructed as that the upper portion can be distended or opened out, substantially as hereinbefore described, for the purposes set forth.

39,397.—Pistol for Steam Engines.—Benjamin F. Hedden, Norwich, Conn.:

I claim the sectional, removable hollow screw-rod, i, provided with steam ports, k k' p p, valve, D, and valve seats, in combination with an expansible packing ring, piston, the whole being constructed and arranged substantially as herein described.

39,398.—Blow-pipe.—John S. Hull, Cincinnati, Ohio:

I claim the application of atmospheric pressure by simple pumping to the alcohol in the reservoir, forcing the same in a liquid state through the jet pipe; and vaporizing it therein, just before it issues therefrom; substantially as and for the purposes herein specified.

39,399.—Lamp Burner.—John S. Hull, Cincinnati, Ohio:

I claim the inner cone partition, C, arranged in the inside of a lamp burner, in combination with the perforations, a a, of the outer case, substantially as and for the purpose herein specified.

I also claim the notches or scallops, c c, in the lower edge of the partition, C, for the purpose designated.

39,400.—Lamp Burner.—John S. Hull, Cincinnati, Ohio:

I claim introducing the draught air by first descending, from the outside, into a separate, or inclosed chamber, c, and thence ascending through a perforated partition or "cone," B, into the burner chamber, in combination with a flat wick tube, substantially as and for the purpose herein specified.

39,401.—Cutter for Harvesters.—Stephen Hull, Poughkeepsie, N. Y.:

I claim an open cap slotted guard finger provided with the depressions, d d', below and between the elevated plane, c, and the lowered plane, e, and with the flanges, b b, so that the finger beam and the knife-rod have a front bearing about equal to their combined thickness, below the plane, c, and the sickle a continuous top bearing on the flanges, b b, in combination with separated or spaced back guides, E E, which allow a free rear discharge of dirt from below the sickle, substantially as described.

39,402.—Furnace for Steam Boilers.—G. G. Hunt, Quincy, Ill.:

I claim, first, The inclined partition, F, placed within the furnace, A, and arranged relatively with a perforated air tube, G, substantially as shown, whereby the furnace is divided into two compartments, a fire chamber and a combustion chamber, and the smoke and gases compelled to pass down through the fuel or fire in order to pass through the throat, G' into the combustion chamber, as and for the purpose herein set forth.

Second, The man-hole, I, in the partition, F, provided with the cover and damper, J, arranged as shown relatively with the door or feed-hole, C, and throat, G', to operate as and for the purpose set forth.

39,403.—Harvesting Machine.—John Jenn, New Windsor, Md.:

I claim, first, Operating horizontally revolving reel or rake arms by crank and pitman, substantially as described.

Second, the combination of the crown or bevel cog-wheel, h, gearing with the clutch pinion, D, in line with the pivots, f f, the reel and rake shaft, H, and the multiplying gearing, h' h'', and the shaft, r, mounted within the gear frame, F, and employed to transmit motion to the cutters, when the said parts are constructed, arranged and operated in the manner and for the purposes specified.

Third, The combination of the supporting springs, G, with the pivoted gear frame, F, arranged and operating substantially as and for the purposes set forth.

[In this invention a series of cranks are employed to raise and lower the sweep or rake arms at proper periods in their revolution. The device involves less friction, and is less liable to derangement, than others previously employed for the same purpose.]

39,404.—Gage for Metal Planing.—H. H. Jennings, New Haven, Conn.:

I claim the spring, F, and set screw, G, in combination with the box, E, index arm, C, and upright bar, B, all arranged substantially as shown, to form an improved implement or device, for the purpose specified.

[This invention relates to an improvement in gages such as are employed on metal planing machines, for adjusting work horizontally or inclined on their beds, as may be required. The object of the invention is to obtain a gage of the class specified, which may be adjusted or manipulated with far greater nicety than the ordinary ones in use, and with much greater facility, so as to economize in time in adjusting the work on the bed.]

39,405.—Revolving Fire-arm.—B. F. Joslyn, Stonington, Conn. Ante-dated May 26, 1863:

I claim, first, In connection with revolving fire-arms arranged for the use of metallic cartridges, a recoil plate on the frame or on a breech plate attached to the frame, said recoil plate being situated at the rear of the cartridge, when the latter is in position to be discharged, and operating so as to permit the free turning of the cylinder, as herein described.

Second, The block, E, arranged to turn in the frame on the movement of the hammer, and having a yielding pin, h, adapted to the recess in the rear of the cylinder, the whole being arranged and operating substantially as and for the purpose herein set forth.

Third, The rod, K, and tubular rod, K', with its spring, the whole being connected to the barrel substantially as described, and arranged to serve the double purpose of a front center pin for the cylinder and an instrument for discharging the spent cartridges.

39,406.—Revolving Fire-arm.—B. F. Joslyn, Stonington, Conn.:

I claim, first, Making the frame, A, and stock, B, in two parts, the former carrying the cylinder and the latter carrying the hammer, trigger, mainspring, &c., and the two parts being secured to and rendered detachable from each other, as described, for the purpose specified.

Second, The block, E, adapted to the cylinder, D, and to the frame, A, as set forth, for the purpose specified.

Third, The spring, K, with its projection, t, the loose pin, w, inclination, y, and indented block, E, the whole being arranged for joint action, as and for the purpose described.

Fourth, The arm, G, hinged to the barrel and the rod, F, both being so arranged in respect to the cylinder, and the bores of the same, that the said rod may serve the two-fold purpose of a center-pin and an instrument for forcing the spent cartridges from the bores, as described.

39,407.—Breech-loading Fire-arm.—B. F. Joslyn, Stonington, Conn.:

I claim the beveled projection, b, on the breech piece, in combination with the spring, E, when both are arranged for joint action on the case of the cartridge, substantially as set forth for the purpose described.

39,408.—Vessel-of-war.—J. L. Jürgens, Isle of Föhr, Kingdom of Denmark, assignor to himself and J. E. Hoover, Washington, D. C.:

I claim, first, Constructing a ship with funnel-shaped spaces, K K, passing transversely through her vital parts, substantially as and for the purposes specified.

Second, The transverse chambers, G G G, provided with oblique metallic armor for the protection of men, guns or machinery, substantially as set forth.

Third, The use of masses, L L, of cork or other buoyant material, in converging spaces between mail-clad chambers, substantially as and for the objects specified.

Fourth, The combination with the hollow masts, N N, of the central revolving tubes, n, and swivel plates, O, constructed and arranged as specified, to preserve the masts from destruction by the penetration of shot.

Fifth, The pikes, R R, projecting from the bulwarks, Q, and mounted upon rods or bars, R', by which they may be elevated or depressed in the manner described.

Sixth, The side arms or wings, S S, constructed and operated as described, to fend off or grapple an enemy.

Seventh, The water-tight compartments, T, between the inner and outer shell, each provided with one or more ascending tubes, to permit the extinction of fire, substantially as described.

[The primary object of this invention is to so construct a vessel that she may be penetrated by shot without injury to her vital parts—machinery, armament, or crew.]

39,409.—Revolving Fire-arm.—James Kerr, Southwark, England:

I claim, first, The combination of the lever, E, trigger, F, link, h', stud, h, hook, g, and extra "bent," a, with the ordinary tumbler and sere, these parts constituting a lock detached from the body or frame, as hereinbefore described and illustrated by my drawings.

Second, The adaptation and use to and in revolving fire-arms of the ordinary gun and pistol lock detached from the body or frame, as hereinbefore described.

Third, The peculiar mode, hereinbefore described, of connecting the barrel with the frame and stock, when such barrel is forged apart from the body or frame.

39,410.—Pan for backing Electrotypes.—W. A. Leggo, Quebec, Canada:

I claim the perforations or holes, d, in the bottom of the inner pan, B, when the same is used in combination with the outer pan, A, in the manner and for the purpose, substantially as herein shown and described.

39,411.—Plow.—C. M. Lufkin, Acworth, N. H.:

I claim a coulter, I, connected by a lever, H, and slide bar, K, to the mold-board, F, in such a manner as to admit of the movement of the coulter from one side of the beam, A, to the other, by the adjustment of the mold-board, as herein set forth.

I further claim the curved arm, f, on the coulter, I, in connection with the pin, g, in the socket, J, and the slide, i, and spring, j, all arranged to operate as and for the purpose specified.

[This invention consists in attaching a coulter to the plow beam and connecting the coulter with the plow or mold-board, in such a manner that the coulter will be shifted from one side of the plow beam to the other, by shifting the mold-board, the plow being of the kind which is commonly termed a side-hill plow.]

39,412.—Cultivator.—A. S. Markham, Monmouth, Ill.:

I claim, first, The frame, A, having the draft-pole, B, attached to it in connection with the rollers, C, fitted in the lower part of said frame, A, and the plow beams, D, attached to the frame, A, and connected at their back parts by the bar, G, substantially as and for the purpose specified.

Second, I claim the particular manner of connecting the plow beams, D, to the frame, A, to wit, by having the front ends of the beams slotted longitudinally with pins or bolts, g, passing through the slots into bars, I, which are fitted loosely on shafts, e, substantially as and for the purpose set forth.

Third, The draft bars, J, attached to the front ends of the plow beams, D, by bolts, j, and connected at their upper ends to the frame, A, by chains, l, and having hooks, k, secured to them, all arranged as shown, whereby the draught may be regulated, and the beams, D, adjusted longitudinally as may be required.

[The object of this invention is to obtain a cultivator which will crush the clods of earth and pulverize the same as the machine is drawn along, so as to admit of the plows operating in a thorough and efficient manner, the parts being so arranged that the plows will be under the complete control of the operator, or driver, and made to conform to the sinuosities of the rows of plants, so that none of the latter may be plowed out of the earth, the machine at the same time being capable of use as a harrow, or for plowing in seed, and operating far more efficiently for that purpose than an ordinary harrow.]

39,413.—Lamp Burner.—John McHenry, Cincinnati, Ohio:

I claim the supplemental cap, E, constructed as described, and applied to the wick tube, D, within the cone or deflector, C, in manner substantially as and for the purposes set forth.

[This invention relates to a new and improved lamp burner for burning coal oil, either with or without a draught chimney, and consists in the employment of a supplemental chamber or flame-spreader, constructed, arranged and applied to the wick tube in such a manner and in such relation with the cone or deflector as to produce a large and brilliant illuminating flame, much larger, it is believed, than is produced by the ordinary coal-oil burners in use.]

39,414.—Roller for Trunks and Boxes.—W. T. Mersereau, Newark, N. J.:

In combination with the plates, A and B, constructed as shown, I claim the use or employment of the roller, C, and journal, D, for the purpose substantially as set forth.

39,415.—Adjustable Carriage Pole.—L. C. Miner, Hartford, Conn. Ante-dated Dec. 19, 1862:

I claim the arrangement of the adjustable circular slides, E E, braces, B B, binding clip, G, and the vibrating socket-joint connections, I K, in combination with the evener bolt, C, and attachments, in the manner and for the purpose substantially as herein set forth and described.

39,416.—Ventilating Cap for Tents.—John Moakley, New York City:

I claim the ventilating apparatus for tents, constructed and operating substantially in the manner described.

39,417.—Brush.—Samuel Morris, Charlestown, Mass.:

I claim the improved brush, substantially as described, as made with a japan or water-proof and flexible composition applied to its back, so as not only to cover and finish the same and dispense with a solid, separate, covering plate, but enter the bristle holes and hide them and the confining wires from view, substantially as specified.

39,418.—Corrugating Steel Metal.—T. W. A. Moseley, Boston, Mass.:

I claim an automatic machine, consisting of the above-described elements or their mechanical equivalents, viz., of first, two fluted or corrugating rollers; second, mechanism for rotating such rollers; third, a carriage for supporting a sheet of metal to be corrugated, and for introducing such sheet between the corrugating rollers; fourth, mechanism for imparting the proper intermittent, reciprocating motions to the said carriage; fifth, machinery for gaging the sheet of metal or determining its correct position on the carriage, preparatory to the sheet being moved up to and introduced between the corrugating rollers.

I also claim the arrangement and application of each of the cams, k, with respect to its corrugating roller or the axis thereof, constructed and operating substantially as and for the purpose described.

I also claim, in combination with the sheet carriage, D, and the mechanism for imparting to it reciprocating intermittent movements, as described, such mechanism being the cams, k k, and yokes, n n, a mechanism, viz., the screws, q q, and nuts, s s t t, for adjusting the carriage into parallelism with the corrugating rollers.

I also claim the combination for determining the position of a sheet of metal on the carriage, D, the said combination consisting of the arms, u u, the cranked shafts, v v, the weight, x, the retainer, y, and the cam, z, the whole being arranged and so as to operate substantially as hereinbefore specified.

39,419.—Attaching Bits to Braces.—Obed Peck, Windsor, Vt.:

I claim the jaw, C, hinged to the brace or connected therewith by a joint in combination with the nut, D, and screw thread, c, all arranged as shown, to secure the bit, B, firmly to the brace, and admit of its ready adjustment therein and detachment therefrom, as set forth.

39,420.—Wood Splitter.—C. L. Pierce, Buffalo, N. Y.:

I claim, first, the lever, B, supported and moving upon the fulcrum shaft, C, in connection with the ax, E, and operated by a crank, D, for the purposes and substantially as herein described.

Second, The ax E, and lever, B, supported and moving upon a fulcrum shaft, as aforesaid, in combination with the head block, K, and revolving plate, J, for the purpose and substantially as described.

Third, I claim constructing the ax with a shank provided with a key, as a means of fastening the ax to the lever.

34,421.—Manufacture of Boots and Shoes.—Henry Port, New York City. Ante-dated Oct. 16, 1863:

I claim the sole molded with a skeleton plate of rivets and a lip on the edge, substantially as described.

And I also claim the use of the last with spring recesses, to turn the points of the rivets, as set forth, and of the knife and punches, as described, to cut and punch simultaneously.

39,422.—Car Spring.—J. G. Pugsley, New York City:

I claim the use or employment of a cylindrical spring case, having a central flanch that sustains the springs on either side, and toward which the springs yield.

I also claim the employment of rings on which the springs rest, having a deadening packing between them and the flanch described, and also between the rings and the top and bottom plates.

39,423.—Wheel for Marine Propulsion.—Benjamin Reed, Allegheny City, Pa.:

I claim the use of angular floats or buckets having one point secured to the shaft, and the two outer points stayed by means of rods or bars, when said shaft is placed transverse to the length of the boat, the whole arranged and constructed substantially as described and for the purpose set forth.

39,424.—Fastening for Horse-powers.—Charles Ross, of Hartland, Mich.:

I claim the employment or use of the arms, B, with spurs, c, and plates or feet, C, in combination with the bed pieces, A, of a horse-power or other contrivance, applied and operating in the manner and for the purpose substantially as shown and described.

[The object of this invention is a device intended to secure the bed-pieces or foundation of a horse-power firmly down upon the ground in any place where it is desired to use the power.]

39,425.—Plow.—G. M. Salsbury, Wilson, N. Y., and G. S. Salsbury, Clarendon, N. Y.:

We claim providing a plow with the independent, short beam, H, for the purpose of attaching the coulter, substantially as described.

In combination with the short beam, H, we also claim the adjustable beam, A, when all the parts are constructed and arranged as herein set forth.

39,426.—Metallic Basket.—Allen Schenck, Chicago, Ill.

I claim a sheet-metal basket or vessel composed of a series of sections, a, bent or swaged in proper form, corrugated or fluted, and secured together by rivets or solder, substantially as herein set forth.

39,427.—Incendiary Sub-caliber Projectile.—C. W. Stafford, New York City:

I claim, first, The combination, in a sub-caliber projectile, of the following elements, viz., a cutting or punching face, a solid central core and an annular chamber surrounding the said core, and chiefly or entirely included within the area of the punching face, substantially as herein described, for the purpose of carrying incendiary or explosive material into the aperture made by the shot.

Second, The combination of the central core, a2, casing, B, and band, H, operating substantially as described, to retain the contents of the chamber, C, during the flight of the projectile, and discharge it within the cavity formed thereby.

39,428.—Cultivator.—C. C. Stearns, Homer, Ill.:

I claim the rising and falling bars, F, having plows, H, attached to them, in connection with the guides, G, provided with the catches, L, the above parts being arranged as shown, with the bars, D D, attached to the axle, A, and cross-bar, E, as and for the purpose set forth.

[This invention relates to an improved corn cultivator of that class in which gang plows are used for plowing two rows of corn simultaneously. The invention consists in the employment of two frames attached to a mounted frame, and arranged in such a manner that they may be raised and lowered without the aid of levers, and retained in proper position by means of suitable catches.]

39,429.—Condenser of Steam Engines.—F. B. Stevens New York City:

I claim, first, The general arrangement, construction and combination for increasing the average difference between the temperature of the steam to be condensed or of the water to be cooled, and that of the cooling water by the combination of a cooler or of a surface condenser with a double eduction, in the manner herein described.

Second, In connection with the combination of a cooler with a double eduction, the arrangement by which the water taken from the hot well of the common condenser is injected into the additional condenser, in the manner described.

Third, In connection with the combination of a cooler with a double eduction, the arrangement by which a separate cooler is used for each condenser, in the manner herein described.

Fourth, delivering the steam discharged by the first eduction from both the cylinders of two connected condensing engines into one condenser, and by delivering the steam discharged by the second eduction from both these cylinders into another condenser, in the manner herein described.

39,430.—Steam Engine.—F. B. Stevens, New York City:

I claim taking the steam from the cylinder by the first eduction on the induction side of the piston without the intervention of a valve moved by the mechanism of the engine, as herein set forth and described.

39,431.—Piston for Steam Engines.—N. P. Stevens, Boston, Mass.:

I claim, in combination with the piston head and its expansive ring or rings, an apparatus by which, through the action of the steam used in the cylinder, for propelling the main piston thereof, the pressure or rate of steam pressure for expanding the rings may be diminished with respect to the pressure or rate of steam pressure exerted on the piston to drive it, while such piston may be in operation within an engine cylinder.

And I also claim the apparatus, substantially as described, for diminishing the steam pressure on the piston rings relatively to that on the end of the piston, meaning to claim the apparatus whether inclusive or exclusive of the means, as described, for discharging the waste steam from the rear of the two concentric pistons of such apparatus.

39,432.—Photographic Camera.—John Stock, New York City:

I claim, first, Attaching the front part, a, of a camera to the movable bottom plate, n, by means of a tongue piece, b, fitted into a suitable groove and secured by a hook, d, and brace, e.

Second, I claim attaching the after part, g, of the camera to the sliding bottom, i, by means of hinges, 3, and secured by suitable braces.

Third, I claim attaching the hinges, 2, for the purpose of folding the bottom plate, n, on the underside of said plate, in combination with the strips, o and o', arranged as described and for the purpose set forth.

Fourth, I claim the strips, p p, attached to the sides of the bottom plate, n, acting on the side pieces, k, of the sliding bottom, i.

Fifth, I claim the movable back plate, w, of the plate holder together with its springs, x y and z, and in combination with the extended after part, Z, of the plate holder, when arranged and operating in the manner and for the purpose substantially as set forth.

Sixth, I claim the trough, 8, attached to the inside of the back plate, w, for the purpose of receiving the drippings of the glass plate, as well as to close the opening in the bottom of the plate holder.

Seventh, I claim hanging the plate holder on the top of the after-part, g, of the camera, by means of a suitable hook, q, in combination with a slide plate, h, attached to the after-part, g, of the camera, said plate, h, having regular divisions, through which, in connection with the pin, 5, or its equivalent, the plate holder can be regularly moved, so that any desired number of pictures may be taken.

Eighth, I claim the arrangement and combination of the frame, 16, rod, S', with nose, S'', to hold the glass plate, t, in connection with the rod, S, to operate the same, and the manner of liberating the glass plate, substantially as described.

Ninth, I claim the arrangement of the packing, 14, through which the rod, S, works, for the purpose described.

Tenth, I claim the arrangement and use of the frame, 15, with its guide, 19, in a developing bath, for the purpose described.

39,433.—Bell.—J. S. Tibbets, Evansville, Ind.:

As an improved article of manufacture, I claim a bell cast of oval form in its horizontal section, and a sinuous chime, as herein set forth.

[This invention relates to an improvement in that class of bells which are suspended and have an oscillating clapper either within or at the outer side of the bell. The invention consists in constructing the bell of oval form, and also with a sinuous or increased length of

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chime, whereby an increased volume of sound is obtained over an ordinary bell of the same weight, and also a more prolonged sound obtained with an improved tone.]

39,434.—Dental Plate.—George W. Tripp, Auburn, N. Y. Ante-dated Feb. 7, 1863 :

I claim, first, The lining, coating or covering of vulcanized rubber or other vulcanized gums, when the same are used in dental plates, with a plating of gold or other suitable metal, substantially in the manner and for the uses specified.

Second, I claim the concave band, B, figure 2, substantially as and for the purpose specified.

Third, In combination with the gum and metallic plates, I claim the spherical segments, c, and the incisions, D, as set forth.

39,435.—Rail Coupling for Railroads.—Samuel Vanstone, Providence, R. I. :

I claim the welding of two such half bars together, substantially as described, the bar thereby formed to be cut into the requisite lengths or pieces to form the aforesaid rail coupling, substantially as and for the purpose set forth.

39,436.—Car Coupling.—Hazen Webster, Elgin, Ill. :

I claim the curved projection, C, in combination with a hook or catch, D, so as to make the coupling operate also as a bumper, substantially as set forth and specified.

39,437.—Sole-cutting Machine.—S. S. Weed, Stoneham, Mass. :

I claim, first, Rotating the die, D, and a last-shaped cutting block, simultaneously, so that the toe of the knife shall always correspond with the toe of the block, substantially as set forth and for the purpose described.

Second, The particular combination of devices for giving a partial rotation of the knife or block, after each cutting operation, said devices consisting of the pin, or roller, m, grooves, X, and spring valves, W, substantially as and for the purpose described.

Third, Holding the die and block, while the cutting operation is performed, by means of grooves in their ends and the guides, P and Q, or their equivalents, substantially as set forth and for the purpose described.

Fourth, the slotted, vibrating cam, U, arranged and operating substantially as described.

Fifth, The valve or door, s, arranged and operating substantially as set forth.

Sixth, Raising or depressing the cutting block by means of the screw, I, strap, G, lever, J, and toggle, H, substantially as described.

39,438.—Lamp or Gas Shade.—M. J. Wellman, New York City. Ante-dated May 19, 1863 :

I claim the employment of opening screens in combination with the shades, as and for the purpose set forth.

39,439.—Brush.—J. L. Whiting, Portland, Maine :

I claim a brush handle with a wedge or cone-shaped point, in combination with a cone-shaped ferule, the wedge or cone-shaped point being inserted into the butt end of the knot or bristles, after being saturated with hot pitch or other resinous substance, as specified.

39,440.—Railroad Car Brake.—T. J. Whitney, Broad Ax, Pa. :

I claim, first, Combining with longitudinally-sliding buffer rods, D, running in a continuous line through the entire train of cars, the lever, E, connecting rod, F, friction brake, G, drums, H H′, double ratchet wheel, J, pawls, m m′, wheels, k k′ k″, chain and rod, L′ L, and brake-bar, M, all operating substantially as herein described.

Second, The spring, b, applied to the buffer-rod, D, in combination with the lever, E, and operating substantially as herein described.

Third, The friction drums, H H′, double ratchet wheel, J, pawls, m m′, in conjunction with the vibrating bifurcated brake, G, and sliding buffer-rod, D, operating substantially as herein described.

Fourth, The application of the compound gearing, k k1 k2, with the double ratchet wheel, J, drums, H H′, and brake arms, g g′, to the axle of a car, substantially as and for the purposes herein described.

39,441.—Closing Fruit Jars and other Vessels.—John Harbster, Reading, Pa., assignor to W. M. Griscom, Philadelphia, Pa.:

I claim, first, The disk, B, of tinned plate or other anti-corrosive metal or other material with its bevelled edge, m, in combination with the plate, E, and gum-elastic ring, n, and the screw, E, and yoke, D, or other equivalent devices, for imparting pressure to the disk, B, the whole being arranged, operating and applied to the mouth of the vessel, substantially as described.

Second, Forming holes, f, in the cover, F, for the purpose of readily withdrawing the said cover as described.

39,442.—Sewing Machine.—James A. & Henry A. House, Brooklyn, N. Y., assignors to themselves and Augustus G. Seaman, New York City :

We claim, first, Making the casing of a sewing machine in sections, so constructed and connected that they may readily be separated and the mechanism removed, and yet when the sections are united the mechanism shall be enclosed and protected; substantially in the manner described.

Second, Mounting one of the guides by which the movements of the frame which carries the stitching mechanism are controlled, upon one section of the casing of a sewing machine, while the other guide and the adjusting gage are mounted upon the other section, substantially in the manner described.

Third, Mounting the stitching mechanism of a sewing machine in a frame which traverses upon the main framing or casing, is enclosed within it, and which can readily be detached therefrom, substantially in the manner described.

Fourth, The combination in a sewing machine of a travelling frame which carries the stitching mechanism and gearing, with a traversing screw mounted upon one end of the frame, and acting upon a fixed point on the casing, substantially in the manner described, for the purpose of traversing the frame as set forth,

Fifth, Mounting the nut of the traversing-screw by which the frame carrying the stitching mechanism is traversed, in an open bracket upon the casing, substantially in the manner described, for the purpose of readily detaching and removing the traversing frame, stitching mechanism and gearing, as set forth.

39,443.—Sewing Machine.—James A. & Henry A. House, Brooklyn, N. Y., assignors to themselves and Augustus G. Seaman, New York City:

We claim, first, The combination with the presser-foot of a sewing machine of a locking-lever, which raises and lowers and holds it in either position as desired, substantially in the manner described.

Second, The combination of an adjusting device on the presser-ever, with a locking-lever substantially in the manner described, for the purpose of adjusting the pressure upon the fabric as set forth.

Third, The combination in a sewing machine of a rigid presser-lever, an elastic presser-foot, and set screw or other equivalent adjusting device, substantially in the manner described, for the purpose of adjusting the presser-foot to various thicknesses of fabrics, as set forth.

Fourth, A travelling button or disk through which the needle plays, for the purpose of keeping down the edges of the fabric, as set forth.

Fifth, The combination with a loose perforated button of a tail or handle for the purpose of adjusting it, without injury to the fingers of the workman, as set forth.

Sixth, Mounting a perforated disk or button loosely in a slot in the presser-foot of a sewing machine, substantially in the manner described, so that it is free to rotate or traverse with, and yet can readily be removed from the needle, while at the same time it is always kept in place, as set forth.

Seventh, The combination of a perforated travelling button with guides or standards on the stitching plate of a sewing machine, substantially in the manner described, for the purpose of holding the button in the proper position while travelling with the needle, as set forth.

Eighth, The combination in a sewing machine of a presser-foot, a disk or button, and a stitching mechanism in such manner that the button while held in the former travels freely with and conforms to the movements of the latter.

Ninth, The combination in a sewing machine of a clamping device which holds the fabric to be sewed, an eye-pointed needle, and a thread-carrier or looper both of which penetrate the fabric and a perforated disk or button connected with the clamping device and conforming to the movements of the stitching mechanism, in such manner as always to keep down the edges of the fabric while the stitches are being formed therein.

39,444.—Sewing Machine.—James A. & Henry A. House, Brooklyn, N. Y., assignors to themselves and Augustus G. Seaman, New York City :

I claim, first, Arranging the tension apparatus of both needles, or the needle and looper or shuttle of a sewing machine underneath the bed-plate, substantially in the manner described.

Second, The combination of a frog, and a griping-lever, substantially in the manner described, for the purpose of rotating the stitching mechanism when working the eye of a button-hole, as set forth.

Third, The combination of the eccentric, O, and adjustable arm, O′, with the needle mandrel substantially in the manner described for the purpose of graduating the length of the stroke of the needle mandrel, as set forth.

Fourth, The combination of the needle mandrel, the collar, S, and the vibrating cam, S′, with the shaft of the thread carrier substantially in the manner described, for the purpose of rendering the movements of the needle and thread-carrier isochronous as set forth.

Fifth, The combination of the loose or removable tension posts, T, with the rotating disk, substantially as described.

39,445.—Sewing Machine.—James A. & Henry A. House, Brooklyn, N. Y., assignors to themselves and Augustus G. Seaman, New York City :

We claim, first, The combination in a sewing machine of a slotted or grooved needle shank or bar, with a looper or thread-carrier which plays within the slot, substantially in the manner and for the purpose described.

Second, Mounting the looper rock shaft of a sewing machine in bearings adjustable relative to the needle with which the looper cooperates in forming a stitch, substantially in the manner described, whereby we are enabled to use loopers of different sizes, and thus to vary the stitch, as set forth.

Third, The combination in a sewing machine of an eye pointed needle which works up from beneath the table and penetrates the fabric, with a looper or thread-carrier also working up from under the table, penetrating the fabric and playing in a slot in the needle arm, substantially in the manner described.

Fourth, The combination of the adjustable thread guide with the needle mandrel, substantially in the manner and for the purpose set forth.

Fifth, The combination of the friction springs, v2, and rotary disk as and for the purposes described.

Sixth, The combination of the forked shifting lever and friction rollers with the rotary disk, in the manner described for the purpose set forth.

Seventh, Mounting the spool-cases on a bar or bracket attached to the disk, in such manner as to leave a space between the bottom of the spool cases and the disk for the guides, as set forth.

39,446.—Oil Tank.—Seth H. Ingalls, New Bedford, Mass., assignor to himself, Joshua K. Ingalls & Wm. S. Sampson, New York City :

I claim, first, The tank arranged substantially as specified, for the purpose of holding oils, &c., under water, so as to sustain the oils against the top of the tank, by the pressure of water, and thereby prevent all possibility for accumulation of gases or vapors, and all danger of fire or explosion therefrom.

Second, I claim the method substantially as specified for introducing and discharging the oils by hydraulic force.

39,447.—Truss Bridge.—Jonathan L. Jones (assignor to himself and James V. Westlake), St. Louis, Mo.:

I claim, first, The production of a camber or "verse sine," or changing, or reproducing the same, in a truss bridge, by means of plates, H, or their equivalents, applied in combination with longitudinal sections of the upper stringer, substantially as set forth.

Second, The construction of the plates, H, with bolt holes, in combination with the perforated blocks and perforated flanges of the longitudinal sections of the upper stringer, substantially as and for the purpose set forth.

Third, The use of the plates, H, in combination with the blocks, E, tie rods, B, and braces, D D′, substantially as and for the purpose set forth.

Fourth, The combination of the plates, H, blocks, E, tie-rods, B, braces, D D′, and upper and lower sectional stringers, substantially as and for the purposes set forth.

39,448.—Gas Engine.—Oscar H. Kratze, Leipsic, Saxony, assignor to Ferdinand F. Mangelsdorf, Stapleton, N. Y., now of New York City :

I claim, first, The arrangement of the cone, e, covered with some absorbent material, in combination with the adjustable cone, f, and cylinder, A, constructed and operating in the manner, and for the purpose substantially as described.

Second, The arrangement of one or more layers of wire gauze in the induction ports, substantially as and for the purpose set forth.

39,449.—Operating Gun Carriage.—Robert H. Long, Philadelphia, Pa., assignor to Joseph Grice, New York City:

I claim, first, So combining the axle bearings, E E, with the carriage and with tackles for working the gun, that when there is no strain on the said tackles the body of the carriage will rest directly on the bed with its wheels free, but that by the act of hauling on the tackles to run the gun in or out the weight of the gun and carriage is brought on the wheels so that the carriage will run freely, substantially as herein described.

Second, The employment, for combining the axle bearings with the carriage and tackle, of a novel system of double wedges, I I, and levers J J, applied to operate substantially as and for the purpose herein described.

39,450.—Cultivator.—C. E. Mead & G. E. Stevenson (assignors to C. E. Mead), Denmark, Iowa:

We claim the slide bar, G, attached to the axle, A, substantially as shown and provided with the pendants, H H, in combination with the lever, I, plow-frames, J J, shield or guard L, and treadles, K K, all arranged to operate as and for the purpose herein set forth.

[This invention relates to an improvement in that class of cultivators which are designed for cultivating crops grown in hills and drills. The invention consists in constructing and arranging the several parts of the machine in such a manner that the plows may be moved or adjusted so as to conform perfectly to the sinuosities of the rows, and thereby prevent the plants being casually plowed out; the parts being so arranged as to admit of the plows being operated with the greatest facility, so as to be under the complete control of the operator.]

39,451.—Beehive.—G. W. Smith, N. B. Vosburgh, A. I. Kramer and W. L. Winter, Linn County, Iowa :

We claim the slide, E, in combination with the metal sheaths, b, the comb-frames, h, and the doors, B, the whole constructed and arranged in the manner and for the purpose herein set forth.

39,452.—Testicle Supporter.—Smith E. G. Rawson, Saratoga Springs, N. Y.:

I claim, first, A suspensory for the testicles composed of the elastic waist-band, d, bag, a, and elastic buttock straps, g g, constructed and arranged substantially as described.

Second, Making the bag, a, with a penis opening, b, through it, surrounded by a rubber, or other elastic band, c, substantially as described, said bag being furnished with the elastic straps, d g g, for the purposes set forth.

39,453.—Ventilating Apparatus for Wounded Limbs.—Thomas C. Ball, Springfield, Vt.:

I claim a ventilating trough constructed of any suitable substance or materials, with rods or slats raised above the trough proper, to which are secured the bands or supports for the wounded limb to rest on, in the manner and for the purposes set forth, or in any equivalent form.

I also claim in combination with said rods or slats a fracture box as set forth.

I also claim in combination with said rods or slats a foot-rest as set forth.

I also claim in combination with said trough proper and rods or slats, the water fountain as set forth.

I also claim in combination with the water fountain the dripping pins in the manner and for the purposes set forth.

39,454.—Take-up for Sewing Machines.—Wm. V. Perry. Burnett, Wis.:

I claim the combination of the elastic rod, A, bar, B, and shifting strap, C; arranged and operating substantially as and for the purposes set forth.

[This is a simple and effective device to take up the slack thread at every upward motion of the needle. It may be adjusted to suit all kinds of work, and by reason of its elasticity it modifies and tempers the strain, so that the thread can be drawn much more tightly without danger of breaking.]

RE-ISSUE.

1,515.—Cultivator.—Paul Dennis, Bemus' Heights, N. Y. Patented Sept. 23, 1858 :

I claim, first, The inclined shovel mold board, B, formed and mounted substantially as described, and constructed highest at its outer edges, so as to form on each side of the standard, A, a recess, c, through which recess a portion of the earth may, after rising upon the mold-board, descend into the furrow in the rear of the plow.

Second, The combination with the beam, A, and mold-board, B, of the adjustable wheel, F, arranged and operating substantially as and for the purposes specified.

[This invention consists in constructing or forming the upper edge of the mold-board with recesses, in such a manner that the earth, as the implement is drawn along, will pass over the top of the mold-board, and drop into the furrow behind it and fill the same, thereby leaving the earth in a level and also in a loose, light or friable state, fumeable to air and moisture, and at the same time preventing earth, sods, stones, &c., being cast against the growing plants, by the mold board, a contingency of frequent occurrence in using the ordinary shovel plows.]

1,516.—Fire-pot for Stoves.—Dennis G. Littlefield, Albany, N. Y. Patented June 25, 1861 :

I claim in the construction of that class of stoves which has a supply cylinder for reserve coal, and an external case which surrounds the fire-pot, and incloses a space into which the products of combustion pass sidewise through apertures in said fire-pot, the employment of soap-stone, fire-brick, or other equivalent refractory, or indestructible, and slowly conducting material, to compose that part of the fire-pot, or burning chamber, between or immediately around said apertures, substantially as and for the purposes specified.

I also claim in combination with the supply cylinder, M, the rings or framing pieces, U R, constructed so as to admit the use, removal, and replacement of separate soap-stone, fire-brick, or other equivalent refractory or heat resisting material, substantially as and for the purpose herein specified.

1,517.—Loom.—Silas Shepard, Taunton, Mass. Patented July 29, 1862 :

I claim the combination of an escapement mechanism (connected to the warp-beam by means of gearing), with the mechanism by which the yarn is let off from the beam by its tension and the stroke of the lay, and by which uniform tension is maintained upon the warp, all arranged and operating together substantially as described.

1,518.—Machine for Clasping Hoops to Ladies Skirts.—Jedediah Wilcox, Meriden, Conn., assignee by mesne assignments of Bela A. Mann, West Meriden, Conn. Patented Dec. 24, 1861 :

I claim a clasp-feeding device, consisting substantially of an inclined plate and one or more guide bars, the whole operating substantially as herein set forth.

I also claim the said feeding device constructed with an opening to permit the escape of misarranged clasps, substantially as herein set forth.

I also claim the combination of a hopper with a clasp-feeding device and with a clasp-supplying device, the combination as a whole operating substantially as herein set forth.

I also claim the combination of a clasp-clinching device with a clasp-supplying device, the whole operating substantially as herei set forth.

I also claim the combination of a hopper, a clasp-feeding device, a clasp-supplying device, and a clasp-clinching device, the combination as a whole operating substantially as herein set forth.

I also claim the combination of a clasp-clinching device with a liberating device operating substantially as herein set forth.

I also claim the combination of a clasp-clinching device, and of a clasp-supplying device with a treadle, operating substantially as herein set forth.

IMPORTANT TO INVENTORS

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York cor-

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respondents ; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London ; 29 Boulevard St. Martin, Paris ; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO., No. 37 Park-row, New York.

Back Numbers and Volumes of the Scientific American

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out of print and cannot be supplied.

Notes and Queries

J. T., of Pa.—Color-blindness is more common than many persons suppose. It is calculated by those who have given this subject attention, that one person out of every nineteen cannot distinguish colors accurately. Locomotive engineers, and the pilots of vessels, should all be examined with respect to their capacity for distinguishing colored signals.

H. Y., of Pa.—A very good cement, for the joints of stone flags and chimney caps, is made with linseed oil, red lead and whiting. Take equal parts of the two latter, and knead them with the oil, until a cement of the consistency of putty is made; when it may be applied with small trouble.

H. M. P., of N. Y.—A cubic foot of hydrogen gas in a balloon is capable of supporting about an ounce weight. Your proposed method of guiding balloons by light spiral fans is not new. Capt. J. Taggart, of Roxbury, Mass., made several ascents with balloons, about ten years ago, in which he used fan guides.

W. P. T., of N. J.—Scrap-iron may be converted into cast steel by placing it in a crucible with about one ounce of powdered charcoal to the pound of iron, and one-fourth of an ounce of the oxide of manganese, then covering the crucible and submitting it to a high heat in a furnace for several hours.

R. P. T., of Mass.—The colors on silk, to which you refer, are dyed with aniline oxides, without mordants. Cotton requires to be prepared with an infusion of sumac to take on aniline colors; but neither silk nor wool require such a preparation.

T. L. D., of Maine.—If any one has made you believe that an 18-pounder field-piece can be fired with a charge of grape shot, from a mules back, without disturbing the equanimity of the beast, you must be remarkably credulous. Common sense would teach you better.

I. S., of Ill.—Methylated spirits proper, are distilled from wood; but common spirits, to which are added a little creosote, are called methylated spirits, in England.

T. L. M., of Ohio.—You will find a table of the character you mention in the present number. The rules or rather sizes there laid down, will enable you to proceed without delay in the construction of your machine.

W. R., of Wis.—Coal tar is certainly a good preservative of wood placed in the ground ; and, if you can obtain it conveniently, we advise you to coat the bottoms of your fence posts with it. We also advise you to season your fence timber thoroughly, before you use it.

T. B. R., of N. Y.—The most convenient disinfectant for your cesspool and sink, is copperas (the sulphate of iron.) Dissolve one pound weight of it, in five gallons of hot water ; and pour it into your sink ; the offensive odor will soon disappear.

L. F. G., of N. Y.—Cast-iron may be granulated by pouring it, while hot, among cold water, then reducing to fine powder, by grinding in an eccentric mill. The grindings of steel tools may be washed and freed from sand, and an impalpable steel powder thus obtained, which may be rendered magnetic. Pure soft iron cannot be rendered permanently magnetic, like steel and cast-iron.

R. L., of Mass.—Forcing pumps for fire engines were employed as long ago as the reign of the Roman Emperor Vitruvius. We do not decide bets. You can use the information as you please.

J. M., of Vt.—Water rams are still used in many places. You will find a full description of them in Silliman's Philosophy.

P. W. D., of Conn.—The machine you speak of has not been illustrated in the SCIENTIFIC AMERICAN.

B. B., of N. Y.—A forth-coming number will contain the information you desire.

G. R., of Conn.—Why brass castings assume different colors, after being turned, or planed, is a question we cannot answer positively. It is due probably to the chemical action of light upon the materials of which the brass is composed.

P. A. C., of Mass.—The sample of paper which you have sent us, made by your machine from basswood, appears to be suitable for many purposes. It is very soft, and similar to the common white blotting paper which we use.

L. J. O., of Minn.—The water upon the surface, and near the sides and bottoms of deep rivers, moves with less velocity than the current in the middle, at some distance below the surface. The air at the surface offers resistance to the water, and the sides and bottom obstruct its flow. Rafts and boats floating down in the middle of a deep river move faster than chips thrown upon the surface

F. M., of Ill.—The alloy, for lining journal-boxes, called Babbitt metal, is composed of 24 parts, by weight, of copper, 24 of tin, and 8 of antimony. These metals are fused together in a crucible, and run into ingots; the alloy is then ready to be cast in the journal-boxes.

C. A. W., of Maine.—Your reasoning is correct as to what might cause the failure of the first Atlantic telegraph cable, in the breaking of the copper conductor, through the elongation of the outer spiral sheath of wire. But it is now known that the cable was indifferently constructed ; and it had been injured before an attempt was made to lay it.

F. R. Van T., of Ohio.—Equal parts of the chlorate of potash, and the sulphuret of antimony, made into a paste, with a gum water ; then formed into pellets and dried, may be employed for the percussion pellets of guns. But the common fulminating powder used in percussion caps, consists of fulminating mercury, nitrate of potash, sulphur, and a little ground glass. You will find a description of the manufacture of percussion caps on page 392, Vol. IV., current series of the SCIENTIFIC AMERICAN.

R. A. B., of Mass.—Send us the drawing and description and we can proceed forthwith.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Aug. 5, to Wednesday, August 12, 1863 :—

A. H. G., of N. J., $16; D. H. P., of Cal., $25; J. K,, of Iowa, $25; E. C. C. K., of Conn., $60; W. C., of Ill., $16; C. C. A., of N. Y., $787·50; G. McG, of Ohio, $25 ; T. J. K., of Ohio, $16; L. E. R., of Ill., $16; P. & H., of Ohio, $16; A. M., of N. Y., $16 ; J. B. B., of C. W., $16; W. & C., of N. Y., $25 ; N. & N., of Ill., $28; B. & B., of N. Y., $100; C. R., of Vt., $16; H. A., of N. Y., $15; H. & C., of Conn., $10; S. D. L., of Mass., $41; W. B H., of N. Y., $16 ; I. M. M., of Conn., $16 ; R. & B., of N. J., $100 ; H. B., of Pa., $25 ; S. & P., of N. Y., $15 ; S. M., of N. Y., $25 ; B. H., of Kansas, $20; G. M., of Ill., $20; L. D. B., of Pa., $20; B. & L., of N. Y., $20; W. G., of Pa., $26; J. P. Jr., of Cal., $20; A. S., of N. Y., $20; J. W. K., of Mass., $20; H. B. S., of Ill., $20; J. H. R., of Mich., $20; R. D. N., of N. H., $20; H. P., of Pa., $20; E. B. R., of N. Y., $16; G. M. L., of N. Y., $10; E. C., of N. Y., $20; C. C. of N. Y., $16; F. R., of N. Y., $20; T. R., of N. Y., $20; B. F. H., of Wis., $20; S. A, & W. H. P., of N. Y., $20; R. M. P., of Wis., $20; M. & S., of Pa., R. R., of N. Y., $20; N. B. H., of N.Y., $16; G. L. W., of N. Y., $16; J. A. V. R., of N. Y., $20; R. H. J., of Ill., $65; H. G., of N. Y., $25; P. T., of N. Y., $25; W. F. P., of Conn., $12; E. B. R., of N.Y., $25; D. L. D., of N. Y., $28; P. E., of N. Y., $28; M. B. W., of Conn., $16; J. T., of Wis., $20; S. W. N., of N.Y., $25; D. C. M., of N.T., $20; M. F. G., of N. J., $25 ; G. W. L., of Ohio, $15.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, August 5, to Wednesday, August 12, 1863:—

W. F. P., of Conn. ; L. M., of N. Y.; L. D. L., of Mass. ; G. H. L., of Ill. ; F. M., of C. W. ; J. M., of N. Y. ; L. B. D., of N. Y. ; L. D. C., of Mich. ; G. McG., of Ohio; P., W. & S., of Cal. ; C. J. P., of Ill. : J. K., of Iowa; P. E., of N. Y. ; D. P. P., of Cal. ; J. N., of Ill. ; B., R. & V., of Ohio; D. L. D., of N. Y. ; W. & C., of N. Y. ; C. B., of Iowa; H. G., of N.Y. ; P. T., of N.Y. ; J. F. B., of Mich. ; E. C. C. K., of Conn.

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TO INVENTORS WHO HAVE INVENTIONS OF practical value, either patented or not, and who have not sufficient capital to bring the same out, by addressing the subscriber may be assisted in so doing, or the right to manufacture be purchased. Describe the article in full, with simple drawings, if convenient, mentioning advantages, &c. Address, by mail, D. B. WHIPPLE, New Haven, Conn. 8 2*

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OFFICE OF THE SIGNAL OFFICER,

WASHINGTON, D. C., Aug. 8, 1863.

Sealed Proposals will be received at this office until SATURDAY, August 29, 1863, at 4 o'clock, P. M., for furnishing for the Signal Department the following articles :—

250 Two hundred and fifty sets Signal Equipments.
30 Thirty barrels Turpentine.
100 One hundred bales Wicking.
200 Two hundred Telescope Holders.
25 Twenty-five gross Wind Matches.
20 Twenty pounds Linen Thread.
2 Two gross Needles.
10 Ten Tap Bores.
20 Twenty Spigots.

The first delivery to be made about the 15th of September, 1863, or as soon thereafter as Government may direct.

The full name and Post-Office address of the bidder must appear in the proposal.

If a Bid is made in the name of a firm, the names of all the parties must appear, or the bid will be considered as the individual proposal of the party signing it.

Proposals from disloyal parties, or where the bidder is not present to respond to his bid, will not be considered.

Proposals must be addressed to "The Signal Officer of the Army," Washington, D. C., and should be plainly indorsed, "Proposals for Field Signal Equipments."

The responsibility of the guarantors must be shown by the official certificate of the clerk of the nearest district court or of the United States District Attorney.

The ability of the bidder to fill the contract, should it be awarded to him, must be guaranteed by two responsible persons, whose signatures are to be appended to the guarantee, *and said guarantee must accompany the bid.*

Bonds in sums of double the amount involved in the contracts, signed by the contractor and both of his guarantors, will be required of the successful bidder or bidders, upon signing the contract.

FORM OF GUARANTEE.

We ——, of the county of ——, and State of ——, do hereby guarantee that —— is able to fulfill the contract in accordance with the terms of his proposition, and that should his proposition be accepted he will at once enter into a contract in accordance therewith.

Should the contract be awarded to him we are prepared to become his securities.

(To this guarantee must be appended the official certificate above mentioned.)

The right is reserved to reject all proposals, if the prices are deemed too high, or if, for any cause, it is not deemed for the public interest to accept them.

Models will be on exhibition at the office of the Signal Officer for twenty (20) days from date. 8 3

BLUES AND CARMINES OF INDIGO.—JUST PUBLISHED. Blues and Carmines of Indigo. A Practical Treatise on the Fabrication of every Commercial Product derived from Indigo. By Felicien Caron de Dole. Translated from the French, with extensive and important additions, by Prof. H. Dussauce. In one volume, 12mo. Price $2·50.

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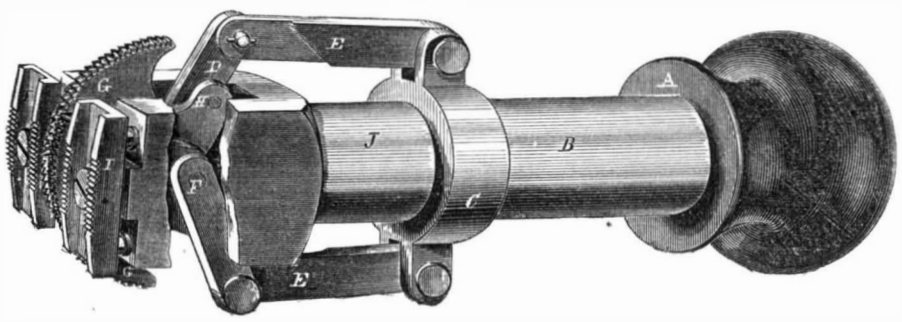
Improved Stamp Canceler.

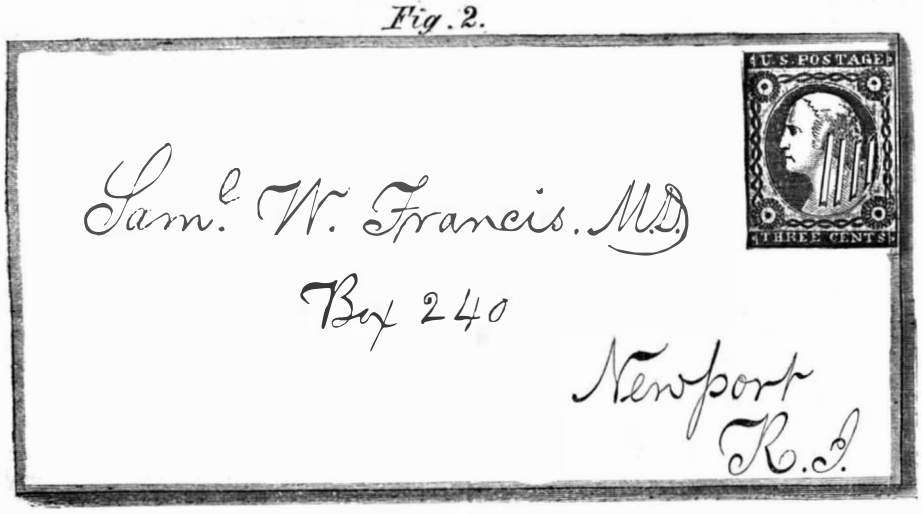
The annexed engraving represents one of a class of instruments which have been needed lately, in the transaction of public and private business. It is a well known fact that all stamps required by the Internal Revenue department, and also those on letters, must be defaced, so that they cannot be used a second time, thus defrauding the Government of its revenue. The canceler herewith illustrated is intended more particularly for the Post Office Department; and, though apparently complex in its outward appearance, is in reality a very simple contrivance, as will be seen by reference to the following description. The wooden handle, A, is securely fastened to the metallic tube, B, which has a collar, C, upon it. The ends of the levers, D, are jointed to the lugs on the collar, by links, E; these levers work on a small shaft, F, which passes clear through the body of the instrument, and is there fixed in its place by a pin and washer. In the extreme end of the instrument, opposite the knob, is the defacing device, consisting of two serrated steel quadrants, G, which work on the shaft, F, previously mentioned; (one side of the jaw of the instrument is removed to show the arrangement), and have lugs, H, by which they are connected with the levers, D. The quadrants work in a slot in the instrument, on each side of which there are serrated plates, I, slightly oval on their faces, which are secured to the bottom by screws, and can be set out, or depressed, in order to make the defacing gear cut to a greater or less depth, as may be desired. The tube carrying the collar, C, slides upon another tube, J, and by pressing down with the wooden knob, A, the plates, I, holds the instrument from slipping, while the quadrants, actuated by the levers, through the motion of the upper tube, work in opposite directions, and saw, or scratch the face of the stamp so that it is irremovable in a sound condition; a concealed spring in the upper tube pushes the lower tube out again, and readjusts the instrument for use. This is in brief the whole of the invention, and it is most satisfactory in its workings. We think, for a mechanical defacer, it is the best one we ever saw; as it is very strong, cannot get out of order with any kind of decent usage, and will do the work effectually, while it does no injury to the letter itself, or its contents. It is now in use we believe in the office at Newport, R. I., where we are told it is much liked. The action of the canceler is shown in Fig. 2, where the address of the inventor, and the defaced stamp are well shown. For further information address Dr. Samuel W. Francis, Newport, R. I., Box 240.

Fig. 1



FRANCIS'S STAMP CANCELER.

Fig. 2.



Window Flowers.

When the windows and balconies are filled with a selection of plants according to taste, and these are planted into moderately large pots sufficient to last them through the growing season, they will require little other attention besides watering, which must be very regularly and constantly done. Plants in this situation, from the position they occupy, are extremely liable to suffer from drought, if there is the least neglect in administering their supply of water. This applies equally to all kinds of plants cultivated in these situations. In order to protect the plants from injury in consequence of the powerful rays of the sun striking directly on the side of the pots, often very thin and forming a mere shell around the roots, it is advantageous to set the pots containing the plants within others just large enough to contain them; the double sides of the pots, together with the small open cavity all around between the two, prevent the evil to a very great extent; and it may be still further prevented by choosing the exterior pot still larger, and filling the cavity between the two with moss, which is to be kept damped. Where moss is easily procured, a bed of it may be formed on the window-ledge, in which the pots could be plunged, the moss being kept damp.—*Cottage Gardener.*

A Capital Idea.

A pleasure carriage passed our office, yesterday, the black top of which had been entirely covered with white muslin. The purpose of thus changing the color was no doubt to avoid the heat that a black surface, exposed to the rays of a burning sun, is known to absorb so much more than a white one. Any one who rides under a black covering, in a sun like that of the past two days, may know, by putting his hand against it, that it becomes as hot as a boiler plate with a full head of steam up, to the great discomfort of the occupant: while the old farmer, under the white linen cover of his market wagon, jogs along comparatively cool. The cost of making the change from black to white is, in such cases, trifling; and the advantage is great, to those who ride much in the sun. The man who put it in practice, in the instance mentioned, is an observer and a philanthropist, whose example should command universal favor.—*Philadelphia Ledger.*

Sound Registering Machine.—M. Koenig, of Prussia, recently invented a machine by which sound points its own undulations and vibrations. A glass cylinder is coated with fine lamp-black, and applied turning to a tuning key, when the latter vibrates. From impressions left on the lamp black, all the different vibrations of sound, from A to G, are registered, and from the records a beautiful series of acoustic charts have been drawn out.

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